

# Chemical Weekly

VOL. XXXIV

AUGUST 1, 1989

NO. 47

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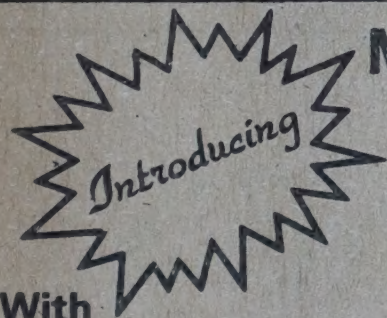
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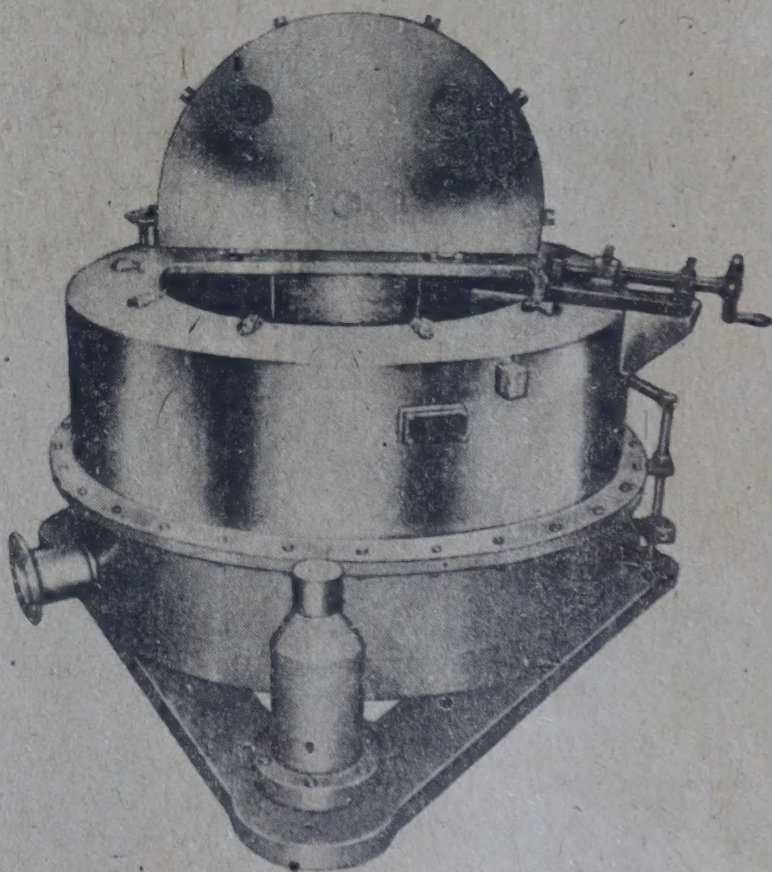


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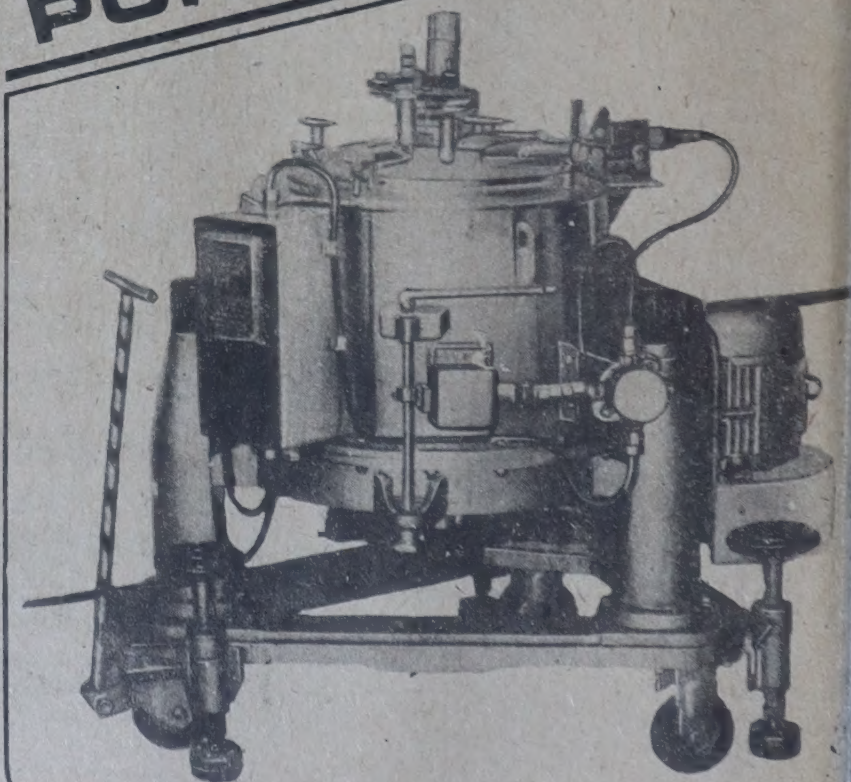
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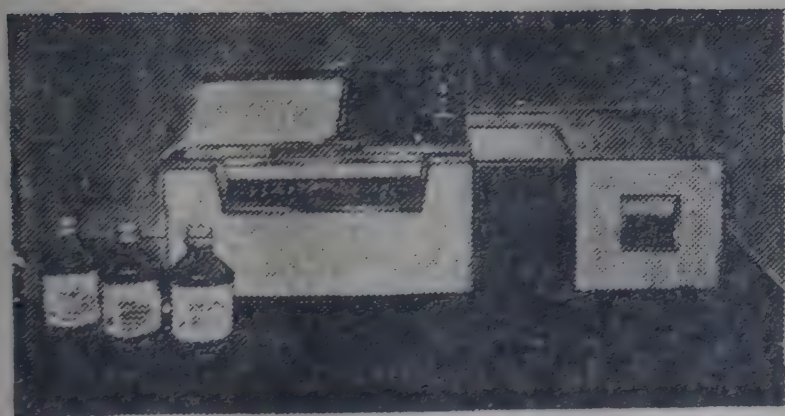
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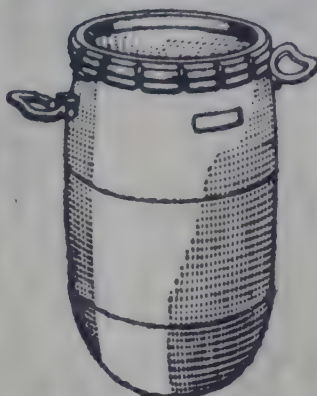
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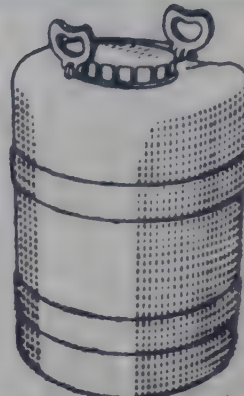
50 Ltrs. Jerry Can



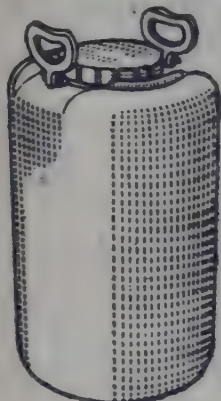
50 Kgs. Round Drum  
Full Top Open - 12" Cap



30 Kgs. Round Drum  
Full Top Open - 10" Cap



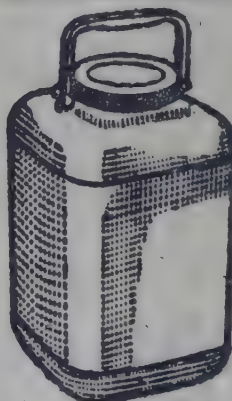
50 Kgs. Round Drum  
- 6" Cap



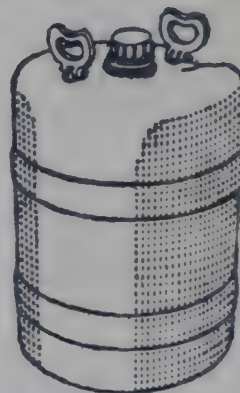
30 Kgs. Round Jar  
- 6" Cap



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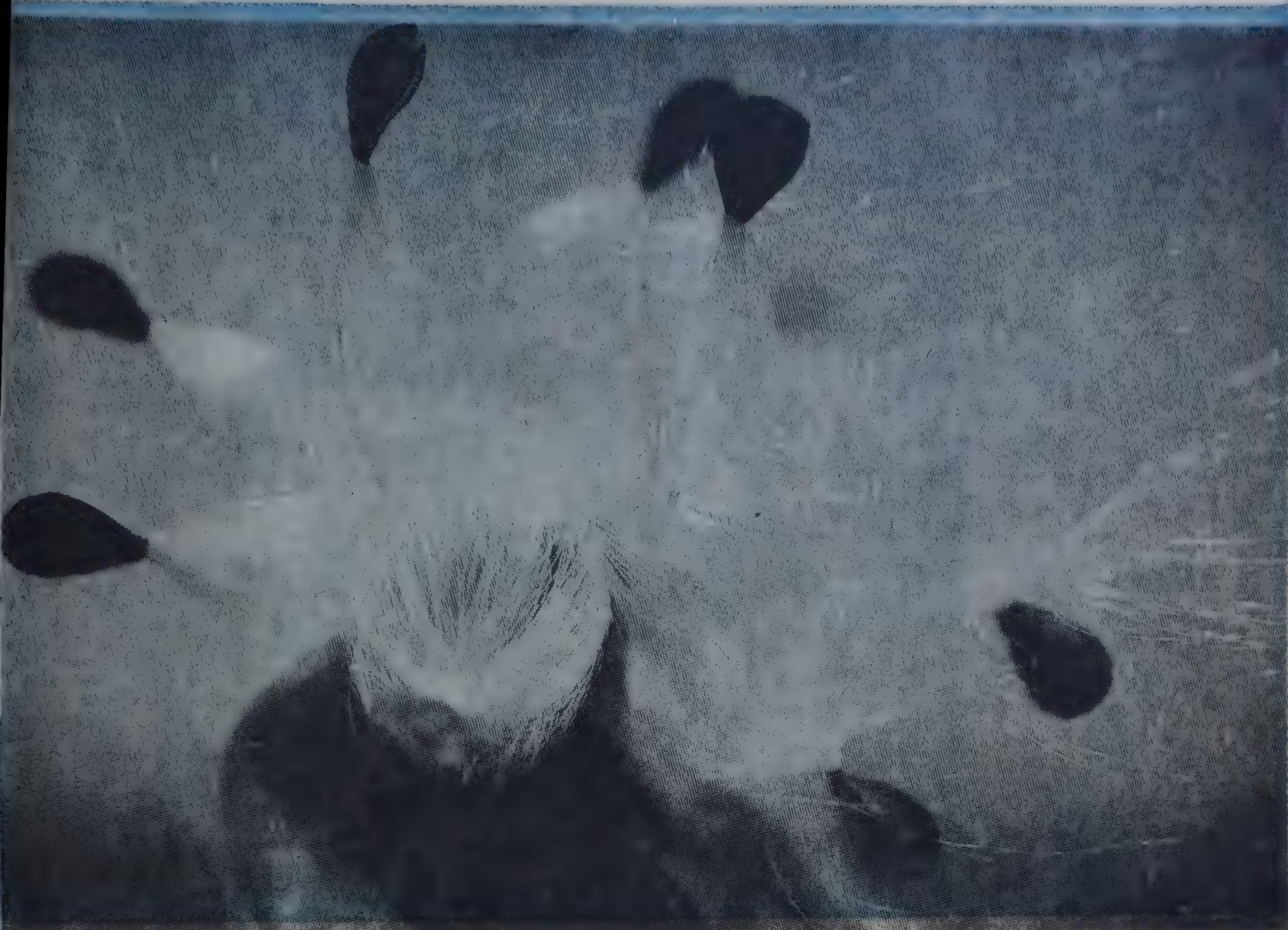
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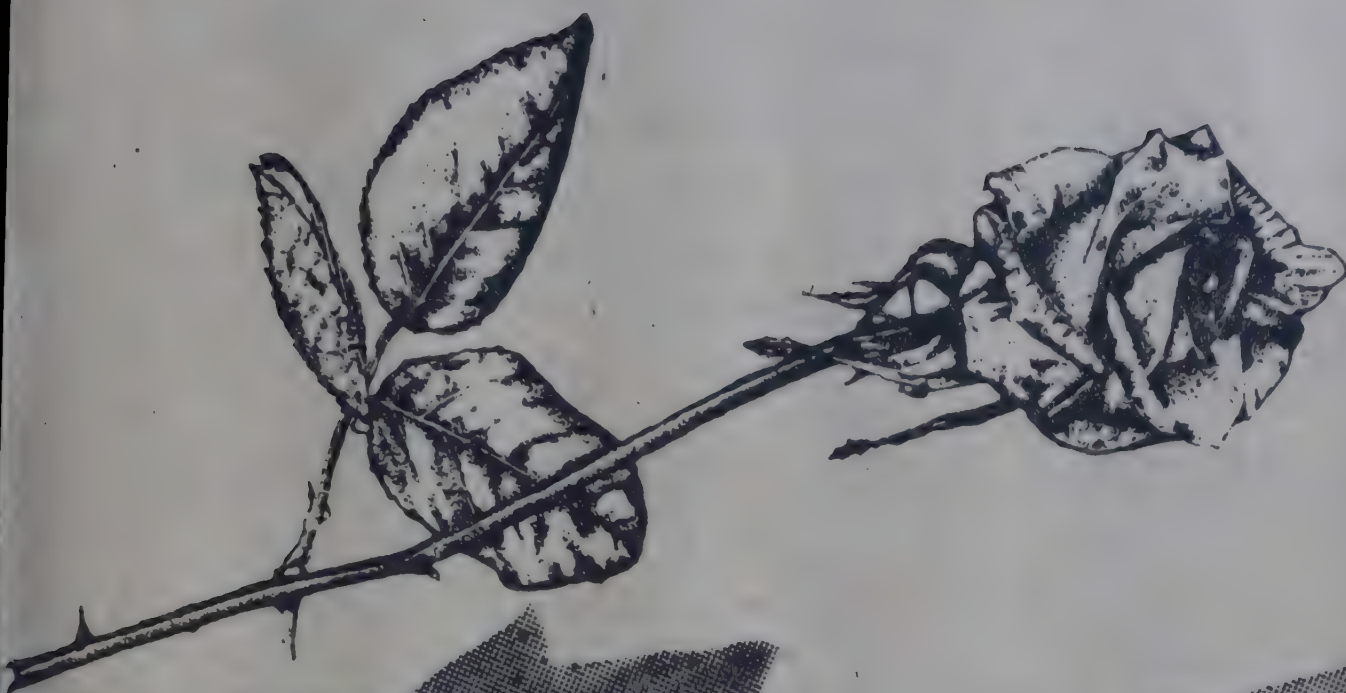
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# CHEMICAL WEEKLY

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## HERALDING THE 21st CENTURY - 25 (c) The Environmental Challenge: Reforesting the Earth

**B**efore the dawn of agriculture, some 10,000 years ago, the Earth boasted of a rich mantle of forest and open woodland covering of some 6.2 billion hectares. Over the centuries, the combination of land clearance for crop production, commercial timber harvesting, cattle ranching and fuel wood gathering has shrunk the forest cover to less than 4 billion hectares i.e. by more than 33%. The denudation of the green cover has been proceeding at a relentless pace and it has now reached a stage where it has begun to impinge directly on the economic and environmental health of numerous nations, mostly in the Third World countries.

Most tree planting efforts over the last several decades have aimed at increasing supplies of marketable timber, pulp and fuel wood for cities and forest products that yield obvious economic benefits. By contrast, reforestation for reasons that lie outside the monetised economy, has been vastly underattended or unattended. Trees quite literally form the roots of many natural systems. With the inexorable march of deforestation, the ecological integrity of many areas is disintegrating -- causing severe soil loss, aggravating droughts and floods, disrupting water supplies and reducing land productivity. In addition trees and soils play a crucial role in the global recycling of carbon, the importance of which has been magnified by the emergence of carbondioxide induced climate change as the most threatening environmental problem of modern times. Another significant factor is that even if forest clearing miraculously ceased today, millions of hectares of trees will have to be planted to meet future fuel wood needs and to stabilise soil and water resources. Increased planting to satisfy the demands for paper, lumber and other industrial wood products is also crucial.

Many countries have no reliable inventory of their forest resources. A 1982 study by the United Nations Food and Agricultural Operations still provides the best information available on tropical forests, closed forests, where the shade from the tree crowns prevents substantial growth of grass, covers three billion hectares worldwide. Another 1.3 billion hectares of open woodlands, forest lands cover a total upto

4.3 billion hectares -- an area almost equal to three times the area on crops. The most worrisome finding of FAO's assessment was that the tropical trees were being cut much faster than reforestation. For the tropical regions as a whole, 11.3 million hectares of plantations were established. Thus ten hectares are being cleared for every hectare planted. In Africa the ratio is 29 to 1, in Asia 5:1. Another little realised factor is that reforestation efforts are diffused in the sense, the tree cutting activities are wide spread while reforestation efforts are concentrated in selected areas.

Satellite imagery of five states in Brazil shows that deforestation in parts of the Amazon has proceeded much faster than what the earlier estimates for the entire region had suggested. Lands data released by the National Remote Sensing Agency of India reveal that India's forest cover declined from 16.9% in the early seventies to 14.1% in the eighties; an average loss 1.3 million hectares per year. FAO had placed India's forest cover in 1980 at 11 million hectares too high and underestimated the true rate of deforestation, almost ninefold. Pressure on land from India's burgeoning cities is seldom calculated as a percentage loss of forest cover. Recent Landsat data shows that in less than a decade forest cover within 100 km. of India's major cities dropped by 15% or more. Delhi alone lost a staggering 60%.

Consumer demand in temperate countries fosters tropical forest depletion. Industrial countries appetite for tropical hard woods has encouraged many third world countries to "mine" their forests to earn vital foreign exchange. As loggers selectively fell commercially valuable tree species -- which account for less than 3% of any given hectare, they often destroy between 30 and 60% of the unwanted trees as well. Roughly two thirds of the world damage has occurred in South East Asia.

Good news regarding afforestation comes from the affluent countries. The United Kingdom holds the record for increasing the net forest cover by 30 to 40,000 hectares per year. In France, forest area has risen substantially from a historic low of 14% two centuries ago to 25% today. Unfor-



Unfortunately, chemical stress from air pollution and acid rain today plays a substantial share of European tree cover facing the risk of decay. Trees covering some 31 million hectares in Central and Northern Europe are showing signs of damage linked air pollution. Scientists are unable to forecast as to how the damage will spread but it is evident that it more than offsets the recent gains presumed to have been made in expanding the continent's forested area.

In the United States, forest area in the last two decades has declined as widening grain export markets encouraged conversion of forest to cropland and as urban and industrial development encroached on woodland. In 1982 forests covered 233 million hectares of the contiguous states -- a ten per cent drop from 1963 and significantly less than the 1920 figure which was the previous low point. In the third world there is no prospect of forest cover stabilising at any time in the near future as all the countries are trying to force the pace of industrialisation as against agriculture. The forces behind deforestation are strong and planting efforts are woefully inadequate to reverse the loss of tree area.

More than two thirds of all third world countries rely on wood for cooking and water heating. The people, from times immemorial are wedded to wood as primary energy source, either in the raw form or after conversion to charcoal. The human and ecological costs of dependence on wood and consequent scarcity of wood are alarmingly high. In rural parts of the Himalayas and the African Sahel, women and children spend between 100 to 300 days a year gathering fuel wood.

Experts generally agree that a successful strategy to meet the fuel wood needs of the third world must include increasing the productivity of natural forests, making better use of the wood now wasted including logging residues and trees cleared from cropland, raising the efficiency with which wood is burnt and raising energy plantations. The World Bank has calculated that the fuel substitutions and the use of more efficient kilns and stoves could reduce the fuel wood needs by a fourth. Eliminating the remaining gap between the projected supply and demand would require planting the equivalent of 55 million hectares of high yielding fuel wood plantations or 2.7 million hectares/year. Actual planting for fuel wood has averaged about 550,000 hectares annually, a fifth of what is needed.

In the Philippines, researchers estimate that 1.4 million hectares of upland watershed have been denuded primarily through uncontrolled felling of trees and unsustainable shifting cultivation practices. Similarly in Central America, where the forest cover had dwindled from 60% of the regions territory to 40% in the two decades following 1960, erosion is rampant everywhere. Heavy siltation has clogged hydroelectric reservoirs, irrigation canals, and coastal harbours. In 1985, an international task force on tropical forest experts judged that some 160 million hectares of upland tropical watershed have become severely degraded through clearing, overgrazing, poor crop production practices and other unsustainable land uses.

The current view is that at least 100 million hectares of tree planting worldwide appears necessary to restore and maintain the productivity of the soil and water resources. Reforesting so large an area -- equivalent to the size of Egypt every year presents a formidable set of challenges. The benefits of planting trees for ecological reasons is difficult to quantify and the rates of return on project investments are not attractive since many of the beneficiaries of upland watershed rehabilitation are located downstream -- who should pay for and carry out the reforestation becomes a crucial issue. Thus even given adequate funding and resources, ecological reforestation schemes are bound to fail, if they do not at the same time address themselves to the needs of the people with no alternative but to tax the upland areas.

Forests play a crucial role in the global cycling of carbon. The earth's vegetation and soils hold some 2000 billion tonnes of carbon, roughly three times the amount held in the atmosphere. Since 1860 it is estimated that the forest clearing has contributed about 180 billion tonnes of carbon to the atmosphere, compared to 150-190 billion tonnes for the burning of the solid liquid and gaseous hydrocarbons. Higher CO<sub>2</sub> levels might enhance the growth of trees, causing them to remove more carbon from the atmosphere which in turn could dampen the warming. But no convincing evidence is available that the natural forests would respond in this way.

Ecologist George Woodwell suggests that rising temperatures from the build up of CO<sub>2</sub> and other green house gases could substantially increase, especially in the middle to the higher latitudes where the temperature rise will be more pronounced. When respiration outpace photosynthesis, trees release more carbon dioxide than they remove, as those in the seasonable forests do during autumn and winter when they lose their leaves. A temperature induced increase in respiration could cause a significant additional release of CO<sub>2</sub> reinforcing the very build up that initiated the warming. If respiration exceeded photosynthesis for an extended period, trees would stop growing and ultimately die thereby negating the basic purpose of the project. According to Woodwell "the sudden destruction of forest by air pollution, now being experienced in northern and Central Europe and in the eastern mountains of North America is but a sample of the destruction that appears to be in store". Indeed what is needed in the coming decades is an effort somewhat akin to the agricultural Green Revolution of the sixties -- a dedication to the development of genetically improved tree species and to extending widely the technical and financial resources for reforestation. Forestry's Green Revolution however needs to promote indigenous tree species and diversified agroforestry systems and must strive to benefit marginalised population including the landless. Accelerating planting that does not benefit the poor can only masquerade as success. The challenge is indeed most formidable and the odds are not in our favour.

-- T.P.S. RAJAN

(Condensed from "Reforesting the Earth" by Sandra Postel and Lori Heise in Chapter 5 of "State of the World 1988" edited by Lester Brown.)



# CHEMARENA

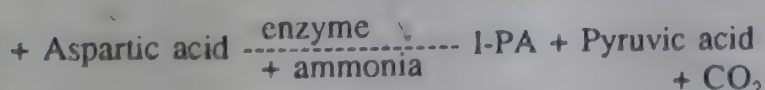
S.L. VENKITESWARAN

## L-Phenyl Alanine

A reference was made to L-Phenylalanine, a component of the sweetener aspartame, having emerged on a recent successful debut of a bio-catalyst system. Phenyl alanine or beta phenyl, alpha amino propionic acid is an important non-essential amino acid but tyrosine which has a hydroxy group in the benzene ring is an essential amino acid. Also the 1-dihydroxy phenyl alanine or l-dopa is an important chemical in the nervous system and l-dopa is used as a drug. But these are by the way. The demand for aspartame, *Nutrasweet*, the trade name of Monsanto, has been growing and capacity and production increasing steadily to meet an estimated demand of 2000 tonnes in 1989 and a bumper growth rate. Monsanto is said to be going in for a plant of 100 tonnes capacity in Brazil to meet the needs of soft drink industry there for non-calorie sweeteners. The key to success is the efficient and lower cost production of l-phenylalanine, more so when patents lapse in the near future. This may explain the intense interest in new processes for L-PA which could touch 5000 tonnes with a value of \$100 million even at a reduced price level. Many companies have been at work on various alternatives and the best lines seem to be a combination of synthetic and enzymatic processes. Both the processes for synthetic intermediates and the production of the required enzymes by recombinant DNA are vital for economic production.

The systems have evolved from cinnamic acid by enzymatic transformation using ammoniolyase or from phenyl hydantoin route which yields phenyl pyruvic acid and aspartic acid. The former is enzymatically converted to L-PA thus both the amino acids for the sweetener are produced.

The reactions are --



Phenyl Pyruvic acid

*E. coli* bacteria are immobilised and used as source of enzyme. Phenyl pyruvic acid is produced by reaction of benzoic acid and hydantoin to yield phenyl hydantoin which is hydrolysed to give phenyl pyruvic acid. An alternative method

is for benzoyl chloride reaction with carbon monoxide and hydrolyse the acid chloride to phenyl pyruvic acid.

In the case of the alternate route from trans cinnamic acid it is aminated to the l-PA using a special yeast. The cinnamic acid is derived from benzaldehyde and aceto acetic ester and sodium acetate (Perkin reaction).

These alternatives have to be evaluated on the basis of raw material availabilities and costs and the price of technology and its development. There is also the possibility of alternative cheaper sweetener making its debut and upsetting the market. Genex of USA is ready with the biotech end of the process sequence and is probably going ahead with production programme.

SRI's estimates of economies are reported to be:

### (1) Cinnamic acid from benzaldehyde (on 2 mill. lbs scale)

|                     |             |               |
|---------------------|-------------|---------------|
| Project costs       | \$ 4.6 mill | US basis 1985 |
| Manufacturing costs | \$ 1.96/lb  |               |
| Overall costs       | \$ 2.82/lb  |               |

### (2) Cinnamic acid from benzyl chloride

|                     |                |
|---------------------|----------------|
| Project costs       | \$ 8.8 million |
| Manufacturing costs | \$ 2.00/lb     |
| Overall costs       | \$ 2.58/lb     |

### (3) Phenylalanine from Cinnamic acid

|               |                 |
|---------------|-----------------|
| Project costs | \$ 23.7 million |
| Overall costs | \$11.67/lb      |

For the alternate process based on hydantoin and benzoic acid the investments are said to be lower as also the production costs at \$10.55/lb. for l-PA.

But these are all based on certain assumptions for USA and can be totally different for other countries. Moreover there may not be a choice for countries like India who have to accept whatever technology is available on licence and take up the projects.



## Sugar and Sugarcane -- inadequate planning

The sugar and sugarcane industry in India is unique in facing problems all the time. Despite bumper production of over 9 million tonnes of sugar every year the Government does not apparently know really what to do and how to go about stabilising the situation on prices and supplies. We were told that there is a surplus and export of 5 lakh tonnes of sugar is being negotiated. Barely two months later we face a big jump in retail price of free market sugar, uncertain supplies and we are told that import of 5 lakh tonnes is necessary to meet the demands. Meanwhile the international market has hardened to nearly double the level of earlier prices and that landed cost of imports will be not less than Rs. 10 a kg. even when customs levy is reduced. Already prices are well over Rs. 9 kg. and set to go higher.

There is no significant change in the monthly releases of either for ration or free sale. What is the mystery of rising prices -- a manipulation of markets with election needs? The price of gur is at an unprecedented level of Rs. 11 a kg. and khandesari even higher. There may be the inevitable rise in prices of sugarcane when the raw sugar fetches fancy prices and the crystal sugar producer has to match the prices. It is difficult to see which way we can move for assured supplies at reasonable prices in spite of all the controls. The only relief is the sustained rise in sugarcane production and promise of more with every hope of achieving high targets of the level of 15 million tonnes a year of sugar in 5 years.

The country must wake up to the enormous waste of unextracted sugar in the sugarcane which goes for making gur and khandesari. The extraction efficiency is woefully short at these units and the sugar left with the fibre is burnt -- a loss of nearly a million tonnes of sugar a year with the additional loss of the precious fibre as a fuel used at a very low efficiency. There is probably no other country where such enormous loss of precious material is encouraged or condoned. Is it not time to look at this problem and find a solution when

we talk so much of food processing industries as a major sector? The potential of sugarcane as the best means of tapping solar energy through photosynthesis has to be fully tapped for sugar and fibre. Perhaps we have to go in a big way to maize and high fructose corn syrup -- HFCS -- as an alternative sweetener to relieve the pressure on prices.

Problems of sugar industry byproducts is another one of pseudo-political dimensions. Molasses or alcohol made from it have not been dealt with as a valuable chemical industry feedstock but more often treated as the Kamadhenu for State Governments, resulting in diversion and wastages. The concept of integrated chemical projects based on molasses is not getting adequate attention. The early projects which had to be located at distant centres with no integration with supply sources, at the dictates of foreign companies continue to be nurtured even if their production now on those lines makes no economic sense. The polyethylene plant of 12,000 tonnes capacity of Rishra is revived on surplus alcohol from U.P. but how long can this continue. The old Union Carbide complex has also run into problems for revival.

The potential for major chemical projects based on molasses/alcohol at centers of availability and without overburden of exise levies is recognised but not enough attention is given for such projects to come up. There is a tendency towards approval of projects of doubtful merit and their blocking out those which would be in the best interests of the country's economy.

It is time that the country goes ahead with revitalisation of the sugar industry, elimination of the enormous waste of sugarcane and sugar fibre in making tonnes of raw sugar, tap the fibre and chemical potential of sugar industry in well integrated projects. It is strange that even now the financial institutions are under instructions to treat alcohol-based chemicals in the negative list.

## Polyethylenes -- Growth continues

The various polyethylenes put together are expected to grow at a average of 4.2% (world wide) up to AD 2000. The share of the three types is estimated at only 1.1% for LDPE, 4.8% for HDPE but a high 9.7% for LLDPE. But the rise in polypropylene will fall from the 11.5% of earlier years to a more modest 8.5%, polystyrenes will also be only a small 3.3%.

The problems in the coming years relate to prices and feed-

stock olefins. The plants in the West operate at over 87% of capacity both of the product and of the olefins and there are plans for 2 million tonnes of new ethylene capacity in U.S.A., though part of it may not get through. Prices have fallen and there is now a squeeze on profits. Polystyrene is probably more in trouble as compared to straight polyolefins or even PVC which needs a non-hydrocarbon co-raw material. India is well placed to expand rapidly if we go ahead.



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## Lack of credit hits 10 alcohol-based projects

The Industry Ministry wants the Finance Ministry to prevail upon financial institutions to remove alcohol-based industries from the 'negative' list which denies them financial assistance.

Some ten projects including new units and expansion schemes of existing units are held up due to lack of credit. A few units have been forced to approach leasing firms for finance, making their projects costlier.

In refusing to assist alcohol-based industry, institutions are following a circular dating back to 1986, framed probably on the basis of the report of the Ganguly Committee set up by the Government to study the prospects of alcohol-based industry.

Written against the background of alcohol shortage which led to sickness and closure of several units, the report had suggested that it was not prudent to encourage creation of new capacities or expansion of capacities in this sector.

The situation today is very different from what it was when the Ganguly Committee compiled its report. Indian distilleries are nursing huge inventories for more than a year now. Distilleries in Uttar Pradesh are finding it difficult to dispose of material despite increased consumption by existing units led by Vam Organic Chemicals Ltd., the leading alcohol-based unit in the country.

Alcohol is selling at Rs. 2.25 a litre in UP, the lowest price anywhere in India. The surplus is despite the commissioning of two big alcohol-guzzling units during the year: India Glycol's monoethylene glycol plant in UP and Bindal Agro's (formerly IEL's) polyethylene plant in West Bengal.

Alcohol consumption has not been able to keep pace with production primarily because of the steady increase in sugarcane yield and productivity in the last few years. Sugarcane production

increased from 6.5 million tonnes in 1986 to almost 11 million tonnes last year.

Unless alcohol consumption by the industry is speeded up, surplus will assume crisis proportions during the Eighth Plan period when sugarcane production is expected to touch 14 million tonnes, it is feared.

Another factor which would worsen the situation in the long run is the Government's well-intended policy to divert the potable sector from molasses to alternative feedstock like tapioca and beetroot. New licences for potable alcohol are granted only to units which arrange for non-molasses feedstock.

To get rid of excess stocks, the Government agreed to the All-India Distillers Association's plea to allow export of the material. Exports made good sense as a short-term solution. A world shortage in alcohol and demand from Brazil, the leading consumer, has lifted the price to about \$400 a tonne FOB Kandla, which is very tempting for Indian distilleries.

In addition, there is a cash assistance of ten per cent on exports. However, out of the 1,250 lakh litres export sanctioned by the Government, hardly 40 per cent material has left Indian shores. This is due to inadequate port facilities and AIDA's inexperience on the export front.

Many distilleries, not allowed to export on their own and disappointed with AIDA's record, are now disillusioned with export as a solution. As things stand today, demand for most alcohol-based chemicals are met indigenously. Unless expansion plans of the industry are immediately taken up, it is likely that shortages will necessitate costly imports in the coming decade. Several projects for production of acetic acid, butanol and butyl acetate are now held up for want of finance.

The acetic acid front is now comfortable with a demand of around 80,000 tonnes fully met by the industry which has an installed capacity of 1,05,000 tonnes. Demand is growing at 12 per cent per annum. With two new PTA plants on the anvil, there will be a quantum leap in demand in the near future. Reliance's export-oriented PTA project will require about 20,000 tonnes of acetic acid.

The JK group is implementing another PTA project in Saleempur. Unless new capacities are taken up for implementation now, the country is likely to witness a paradoxical situation of import of alcohol-based chemicals in the midst of a glut of unutilised alcohol.

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### INDUSTRIAL ALCOHOL PRICE HIKED

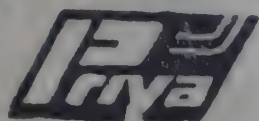
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The Government has increased the price of industrial alcohol to Rs. 2.29 per litre based on the recommendations of the Bureau of Industrial Costs and Prices (BICP).

The notification No. S.O. 412 (E) titled Ethyl Alcohol (Price Control) Amendment Order, 1989, clarifies that the revised price is 'inclusive of the incidence of Central excise duty applicable at the rate of Rs. 120 per tonne of sugar factory molasses and the special excise duty at five per cent'.

The following are the revised prices of alcohol of various grades produced from sugar factory molasses. The price of same grade material produced from khandsari molasses is given in brackets. 1. Absolute alcohol conforming to ISI standard No. 321-1952 naked at 100% V/V strength is Rs. 2,496.66 per kilo litre (Rs. 1,907 per kl). 2. Rectified spirit conforming to ISI standard No. 323-1959 naked at 100% V/V strength Rs. 2,296 per kl (Rs. 1,734 per kl). 3. Rectified spirit conforming to ISI standard No. 323-1959 naked at 94.66% V/V strength Rs. 2,190.66 per kl (Rs. 1,642 per kl).





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## TATA INTEREST IN KARNAL REFINERY PROJECT WANING

**Centre studying 2 proposals to remove bottlenecks**

The Centre is examining two sets of proposals for removing the bottlenecks that have inordinately delayed the setting up of the Karnal refinery project in the joint sector. The first set of proposals envisage waiver of duty on the import of the major equipment for commissioning the refinery, so that the cost of the project comes down by atleast Rs. 600 crores.

The second set of proposals suggest that the project should be allowed to be implemented in the public sector by the Indian Oil Corporation (IOC), as its present partner Tata Chemicals may not be agreeable to a substantially escalated project cost, mainly because of the project import duty.

Latest official estimates show that the cost of the Karnal refinery inclusive of import duty will be over Rs. 2,200 crores. This estimate is based on the government's own assessment and the talks it had with the Soviet Union, which has agreed to provide substantial financial assistance for the project.

These estimates also show that if the import duty is waived, the project cost would decline to Rs. 1,600 crores, at which the project not only becomes viable, but also becomes a highly attractive proposition for the private sector partner in the project, the Tatas.

The Petroleum and Natural Gas Ministry has already initiated a discussion with the Finance Ministry in this context. The Department of Revenue has also undertaken an internal exercise to find out the revenue loss and the benefits in the event of a duty waiver. A meeting between the officials of the Petroleum and Natural Gas Ministry and the Revenue Department held in the last week of July took a view on the issue.

The government is compelled to consider import duty waiver because without this the project cost has risen to a level that the Tatas are having second thoughts on participating in the project.

Their dilemma is believed to have arisen from the assessment that if the project cost is not reduced to Rs. 1,600 crores they would have to mobilise well over Rs. 1,200 crores from the capital market and the financial institutions. The risks involved in floating such a massive public issue are believed to be daunting for the project promoters.

But if the project cost is reduced to Rs. 1,600 crores with the help of the duty waiver, there would be no need for such a massive public issue. With the debt-equity ratio being pegged at 4:1, the promoters have to mobilise only Rs. 320 crores from financial institutions and the capital market. If the cost remains at Rs. 2,200 crores, the component in the project would be as large as Rs. 1,760 crores.

Even in respect of equity contribution to the project, the share capital of the company executing the Karnal refinery project would be Rs. 320 crores if the cost is Rs. 1,600 crores and Rs. 440 crores, if the cost soars to Rs. 2,200 crores. Assuming that 52 per cent of this would be equally contributed by Tata Chemicals and IOC, the promoters would have to cough up Rs. 228 crores on a project cost without the duty waiver. Their contribution would be less at about Rs. 166 crores, if the duty waiver benefit is granted.

Official sources say that the government decision on the duty waiver proposal will be significant for the Tatas. This is because if the relief is granted, the Tatas would remain as partners in the project and otherwise it would reconsider its association.

According to the second set of proposals, IOC will be asked to implement the project on its own in the public sector. It is pointed out that IOC has adequate resources to invest in the project. Moreover, it would be assisted by the Soviet Union in the form of substantial credit. The Soviets would also set

up the project on a turnkey basis. The sources point out that the foreign exchange component in the Karnal refinery cost is now estimated at \$450 million. Exercises are now on to find out how this part of the project cost would be financed.

The Karnal refinery is a much-delayed project, whose foundation stone was laid on March 30, 1987 by Prime Minister, Mr. Rajiv Gandhi just before the state elections in Haryana. Since then, the detailed project report has been revised once.

Meanwhile, a memorandum of understanding was signed between Indian Oil Corporation and Tata Chemicals on May 22, 1987 for the formation of a joint venture company. However, MRTP clearance to the company has not yet been given by the government, giving rise to uncertainty about the project.

The two-year delay has resulted in the escalation of project cost from Rs. 1,200 crores to Rs. 2,200 crores. The present exercise is to either reduce this cost or allow IOC to set it up on its own, so that no more delay takes place.

**NINE BRITISH SAFETY COUNCIL AWARDS FOR IOC (SOUTH)**

Indian Oil Corporation (IOC), southern region, has bagged nine British Safety Council awards for 1988, for the 'excellent safety standards' maintained by its establishments in the region.

According to an IOC press release, the IOC's southern region had also bagged eight national and seven state safety awards during 1988.

This year's prestigious British Safety Council awards have been won by five IOC oil terminals at Madras (Tondiarpet and Foreshore terminals), Visakhapatnam, Mangalore and Tuticorin, the release said. Indian Oil Corporation's LPG bottling plant at Salem, the Tadepalli depot at Vijayawada and the aviation fuel stations at Madras and Cochin, are the other winners of this coveted award.



## IPCL solvent plant may be shut down

Indian Petrochemicals Corporation Ltd. has planned a three-month shut-down of its solvent plant at Baroda from this month-end, it is learnt. The shut-down is aimed at, to commence the expansion of its production capacity for solvents. IPCL produces various vital solvents such as xylene, mixed xylene, solvent C-9, etc. at its solvent plant. These solvents are mainly used for the manufacture of liquid pesticides and also in technical grade pesticides.

IPCL is the main supplier of these solvents to pesticides manufacturing industry although the plants of Indian Oil Corporation and Bongaigaon Refinery in Assam are also manufacturing them. The supplies from the Assam plants are however totally irregular now as the road and railway transport systems are paralysed due to floods.

According to informed sources, the decision of IPCL to go for a shutdown of the solvent plant would seriously hit not only the manufacturers of technical grade pesticides but also the formulators. Some of the leading manufacturers who depend mainly on IPCL are Bayer India, Rallis India, Sandoz India, Gujarat Insecticides and Gharda Chemicals.

The demand for pesticides during the current Kharif season is expected to be substantially higher and there has been big orders for pesticides particularly from the southern states. From August to October, the farmers throughout the country will have to spray the liquid pesticides to protect their crop against various pests, and diseases and if these solvents are not available there could be an acute shortage of pesticides formulations, according to the Pesticides Formulators Association of India.

The Association feels that the targeted agricultural production of 175 million tonnes would not be achieved if pesticides are not made available to the farmers at right time.

The manufacturers of both technical grade pesticides and formulators are therefore of the view that IPCL should postpone the shut-down of the solvent plant upto the end of October, so that production of pesticides may not be affected at this crucial juncture.

### RAW MATERIALS IMPORT: POLICY AMENDED

The entitlement for giving supplementary licences will be worked out by the sponsoring authority on the basis of the requirements for 18 months after deducting the value of unutilised licences, stocks in hand and those in the pipeline. In the case of units under the phased manufacturing programme of indigenisation, the application should be as per the programme. Supplementary licences are granted to cover the requirements for a period of 12 months. This relates to Chapter V of the import-export policy (Vol. I) which

deals with import of raw materials, components and consumables, according to a public notice issued by the Chief Controller of Imports and Exports on July 21.

Another amendment pertains to Appendix 6 -- conditions governing imports under open general licence (OGL). An important condition has been added at the end of the present condition 31:

"In cases where the request for registration of contract is after the stipulated period of 30 days, the importer will be required to approach the Development Commissioner (iron and steel) Calcutta with full justifications for delay in submission of contract documents for registration. The Commissioner will consider such cases on merit and register the contract after condonation of delay."

The amendments have been made in public interest, the notification said.

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## More chemicals being reserved for exports

More products are being added to the list of petrochemical intermediates under the 15 per cent reservation scheme for export production. These include solvent C-IX and hydrocyanic acid, both produced by Indian Petrochemicals Corporation Ltd.

Other products to be added to the list in the near future include orthoxylene, mixed xylene and toluene. The Commerce Ministry has asked Indian Oil Corporation to submit a detailed proposal in this regard.

The Department of Chemicals and Petrochemicals is also studying a request for inclusion of items like caustic soda and acetic acid, produced by the private sector, in the list. At the last raw materials review meeting, the Chairman of the Basic Chemicals, Pharmaceuticals and Cosmetics Export Promotion Council had demanded their inclusion on the ground that producers were exporting some of these items while exporters were importing the same. Import is invariably at a higher price than the export price, he said.

Fixing special prices for these items will be a difficult exercise because unlike in the case of naphtha, no reduced input price is available to producers. At the last review committee meeting, the inclusion of LPG and natural gas in the list was broached upon. This will, of course, require an interface with the Petroleum Ministry.

It has been decided that 75 per cent of the reserved output will be issued on priority basis to the holders of the advance release order (ARO). The balance will be available against proof of past export performance. Effort is also on to enlist private sector units in the scheme.

The scheme for supply of materials at concessional prices is being systematised. All members of the review panel are now required to submit

monthly statements showing production during the month, domestic price, price for exporters, supplies made to exporters and pending orders, if any.

Enquiries with members show that no ARO holders have been refused supplies. Not many exporters are, however, making use of the scheme. Except for some shortage of nitro-aromatics, shortages do not appear to be as acute as often portrayed. Even nitro-aromatics supplies are likely to improve by October by which time Gujarat Narmada Valley Fertiliser Company Ltd. (GNFC)'s concentrated nitric acid plant would have gone on stream and much of the dilute nitric acid now consumed by the fertiliser industry would be available to the chemical industry.

Some exporters have criticised Hindustan Organic Chemicals (HOC) for importing aniline at a time when the international price had climbed to \$1600 per tonne. HOC, they said, is now forcing consumers to lift one tonne of imported material at Rs. 74 a kg for every two tonnes of domestic produce at the price of Rs. 39 a kg.

An HOC spokesman said that it had agreed to import aniline at the request of Indian Chemical Manufacturers Association, and that it was not in any way profiteering. In fact, customers like Atul have appreciated HOC's role in making imported material available, he said.

### NEW GUJARAT INDUSTRIAL LOCATION POLICY

The Gujarat Government has pinpointed the locations where entrepreneurs can avail themselves of the incentives declared by the Union Government.

The State Industrial Extension Bureau has come out with information on location/villages covered within the

banned areas of 24 standard urban areas towns in Gujarat.

To accelerate the pace of industrial development the Government has been taking several measures towards delicensing of industries, simplification of procedures, offering package of incentives and so on.

The Union Government has already announced delicensing of industries and a package of incentives. The industrial licensing system has been liberalised under this package in a very substantial manner.

Exempting the industrial undertaking from taking an industrial licence for the manufacture of a number of products establishing projects involving a investment in fixed assets upto Rs. 5 crores in case of Centrally declared backward areas or upto Rs. 15 crores if they are located in non-backward areas.

In view of above, it has become necessary to identify the areas falling within these distance criteria, so as to simplify the process of selecting the location.

### PIL-HOECHST MoU ON ENGINEERING PLASTICS

Polyolefins Industries Ltd. (PIL) has entered into a memorandum of understanding (MoU) with Hoechst AG of West Germany for transfer of technology on exclusive basis for the manufacture, marketing and product development of Polyacetals (Polyoxymethylene copolymers).

Hoechst AG, and its associate companies in the U.S., Japan and West Germany are world leaders in the technology and market strategy of this high tech product classified as engineering plastics or performance plastics. According to a press release, the company has already signed an MoU with Hoechst which has been submitted to the Government for approval.

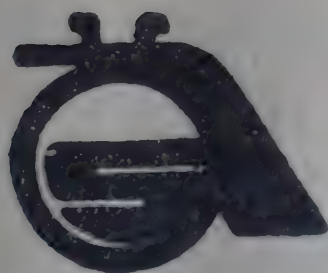


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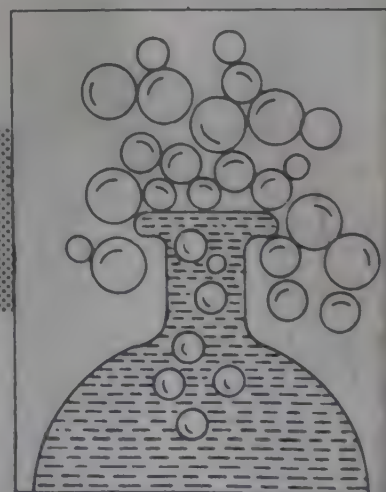
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## CHEMICAL PRODUCTS EXPORT

**Uniform value addition sought**

Chemicals exporters have pleaded with the commerce ministry to fix a uniform value addition of 33 per cent on export of chemical products for being eligible for getting advance licences.

Joint Chief Controller of Imports and Exports insists on a 33 per cent value addition on chemical products covered under Appendix 13-C of the import policy for granting the advance licences.

However exporters pointed out that in some cases even if exporters complied with the prescribed requirement of value addition, JCCIE office insists on a still higher value addition. JCCIE office has been taking a stand that as there are some exporters who actually achieve a higher value addition for certain chemical products, others should also follow the same standard. This was not fair, they say.

Exporters were participating in an open house discussion organised by the Chemical and Allied Products Export

Promotion Council in Bombay. The session was chaired by Mr. Atul Chaturvedi, director, Union ministry of commerce.

They also pointed out that there are a number of new products which are not covered under Appendix 13-C and it was impossible to achieve even the prescribed value addition. The government should take note of such cases.

Exporters also said that the requirement of certification by the chartered accountant for chemical products posed a serious problem particularly to the merchant exporters who are located in Bombay and their supporting manufacturers located in north India.

Mr. M.L. Mehra, western regional chairman of the council, speaking at the session said that council has planned to raise its export target to Rs. 960 crores in 1989-90 from the last year's level of Rs. 744 crores. With the addition of new minerals and ores, the council

could even achieve a total export target of Rs. 2,000 crores in the current year.

**TRADING HOUSES: 'STAR EXPORTERS' RECOGNITION AUTOMATIC**

The govt. has decided to give automatic recognition to export and trading houses as 'star exporters' for the fast track disposal of applications submitted by them for cash compensatory support and replenishment claims. Under the modified scheme, export and trading houses now need not fill up any application forms for recognition as star exporters. On the basis of a photo copy of the valid export house or trading house certificate itself, they would be treated as star exporters. The Chief Controller of Exports and Imports has amended the earlier notification issued in June. The amendment became imperative as filling up of application forms would increase the paper work of exporters, particularly when the export and trading houses are recognised by the govt.

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## UB to set up bulk drugs plant at Tumkur

UB Limited has received a letter of intent for setting up its first bulk drugs plant at Tumkur, Karnataka, in technical collaboration with a French company, Isochem, headquartered in Paris. Mr. P.N. Venugopalan, group vice president of UB's pharmaceuticals division, said that pending foreign collaboration approval, the project was targeted to go on stream by July 1990. The capital outlay for the project had been fixed at Rs. 6.5 crores, of which two-thirds would be financed from internal accruals and the remaining one-third by financial institutions.

Mr. Venugopalan noted that UB Limited had altered its memorandum of association last year to incorporate "the manufacture of bulk drugs and other pharmaceutical products" as one of its objects. The UB Ltd. had shied away from asking any of its associate pharmaceutical companies (Hoechst India, Roussel Pharmaceuticals, Carews Pharmaceuticals, Optrex India, Dominion Chemicals Industries, Pharmacia United) to undertake the manufacture of these bulk drugs.

"All these companies have foreign affiliations and the general philosophy of these foreign companies is not to absorb any technology which would bring them in direct competition with other multinationals. With UB Ltd. this problem does not arise", he said.

The plant would have the capacity to initially manufacture 50 tonnes of Ranitidine (an anti-peptic ulcer drug) and 30 tonnes of Ibuprofen (an anti-inflammatory drug). To enable the company to keep up with newer developments in drug technology, the plant would be a multi-purpose one. The manufacture of Diltiazem, an anti-cardiac drug, was proposed to be taken up in the second year along with other new drugs.

Mr. Venugopalan stated that the company would be paying Isochem a sum of approximately 50 lakhs for the transfer of technology. The payment would be in deutsche marks, which the

French collaborator perceived as the most stable currency in the European market. With the manufacture of bulk drugs, UB Ltd. hopes to make an entry into the export market for pharmaceuticals. The company proposes to tap the marketing expertise of Jenson & Nicholson, which has a presence in 24 countries, to sell the drugs. "Exports by our associate pharmaceutical companies have been restricted so far to formulations exported to Russia and Nigeria. We hope to make our presence in bulk drugs felt by catering to the underdeveloped countries as well as South-East-Asia", he said.

With the manufacture of Ranitidine by UB Ltd., the country would also be able to effect foreign exchange savings worth Rs. 25 crores in the first five years, as the drug was an import substitute product.

The basic raw material for the manufacture of Ranitidine would be "furfuryl alcohol", which is available indigenously. Domestic consumption of Ranitidine is around 55 tonnes per year with an estimated growth rate of 25 per cent annually.

Mr. Venugopalan noted that a vast but highly competitive market existed for bulk drugs in the domestic market also, with 9,800 pharmaceutical companies churning out a staggering 32,000 formulations.

The total domestic market for pharmaceuticals in the country was estimated at Rs. 3,200 crores in 1989. Of this, the UB group hoped to target Rs. 210 crores, with Hoechst India aiming at a turnover of Rs. 115 crores (in the human pharma segment), Roussel targeting a turnover of Rs. 40 crores and the other associate companies accounting for the remaining Rs. 55 crores.

### FICCI PLAN FOR CHEMICAL EXPORT TO INDONESIA

The Federation of Commerce and Industry (FICCI) is drawing up an action plan to boost exports of chemicals

and pharmaceuticals to Indonesia and promote joint ventures in the areas.

FICCI has arranged a meeting of Indian chemical manufacturers with the commercial section of the Indonesian Embassy at New Delhi in order to show list chemicals and pharmaceuticals having an export potential to Indonesia.

A working group has also been set up to explore the possibilities of exporting chemicals and pharmaceuticals and promote joint venture activities with Indonesia.

Chemicals that hold a good export potential to Indonesia are carbon black, hydrogen, rare gases, inorganic acids, aluminium oxide, ammonium chloride, sodium hydrogen sulphate, calcium carbide, methyl alcohol, benzene, toluene and others. Quite a few of these items are produced in India at a competitive cost, according to FICCI.

### GAS THROUGH PIPES LIKELY IN AHMEDABAD

The prospects for supply of natural gas to Ahmedabad city have brightened with the recent discovery of rich deposits of natural gas in the Gandhar oil and gas field. In addition to this, with the combined efforts of the Gujarat Gas Co. Ltd. (GGCL) and the Oil and Natural Gas Commission (ONGC), the technical feasibility of bringing almost 20 lakh cubic metres of gas everyday from Gandhinagar to Ahmedabad had also been established, official sources said.

Meanwhile, the state government had already urged the centre to make the gas available for Ahmedabad. The GGCL, set up under the joint auspices of the Gujarat Industrial Investment Corporation Ltd. (GIIC) and Mafatlal Fine Spinning and Manufacturing Company Ltd., has undertaken a survey to assess the need for natural gas by domestic, commercial and industrial users. The work of surveying, which has been assigned to the Gujarat Industrial and Technical Consultancy Organisation Ltd. (GITCO) and Eastern Business Counselling, was likely to be completed by the end of July.



## Ampicillin price crashes

The price of ampicillin, a widely used broad spectrum antibiotic, has crashed in the market. The price of the drug fell to Rs. 1,600 a kg which is Rs. 300 less than the price of Rs. 1,900 a kg fixed by the government.

Seventeen odd drug units manufacturing ampicillin are holding inventories worth about Rs. 40 crores at present as there are no takers for the drug now. In fact, most of the small drug units engaged in the manufacture of ampicillin are offering the drug at still lower rates.

Formulators of the drug are keeping away from the market at a time when the demand should be normally slightly higher, according to the industry sources. Lack of demand for Ampicillin from the formulators has not, however, resulted in a shortage of ampicillin formulations in the market. The sources point out that one reason for the lack of demand for ampicillin could be the increasing medical preference for more advanced drugs, such as norfloxacin.

Following the drop in demand for ampicillin, there are no takers for penicillin G. Penicillin G is first converted into 6 APA and then to ampicillin. As a result of this, both the public sector drug units, namely the Indian Drugs and Pharmaceuticals Ltd. and Hindustan Antibiotics Ltd. are now nursing huge stocks of penicillin G. The current demand for penicillin G is placed at about 1400 MMU (million megawatt units). As against this, the domestic availability of penicillin G from HAL and IDPL to the units making 6 APA and 7 ADCA, intermediates for ampicillin and cephalixin, is only 400 MMU. The rest of the requirements is being met by imports.

The demand for penicillin G has been growing at a rate of 25 to 30 per cent for the last three years. Drug industry has estimated that the total demand for

penicillin G would be in the region of 3500 MMU by 1995.

### 3 BULK DRUGS EXEMPTED FROM PRICE CONTROL

The government has, for the first time, exempted three bulk drugs from price control for being developed in India with totally indigenous research and development. The drugs are Ranitidine of Ranbaxy Laboratories, Metoclopramide of IPCA Laboratories and Dextropropoxyphene of Wockhardt.

As per the provisions of the Drug Price Control Order, 1987, all drugs developed through indigenous research can get an exemption from price control for the first five years of production. An expert committee was appointed by the government immediately after the announcement of 1987 DPCO to verify the claims made by the drug companies in this context. The government had

already exempted 14 bulk drugs from the price control early this year on the basis of the recommendations made by the Kelkar Committee. Another 26 bulk drugs were taken out of the price control thereafter during last month. With all these exemptions, the total number of price controlled drugs under the 1987 DPCO stands at 121 only.

### PANEL TO STUDY SHIFTING OF CHEMICALS

The Union Ministry of Petroleum and Natural Gas has constituted a working group to study means of shifting bulk storage of crude oil and petroleum products from the oil refineries and congested areas to sparsely populated ones so as to reduce the hazards to these locations. This was disclosed by Mr. H.K. Khan, Secretary in the Ministry while inaugurating a two day national seminar on "health hazards of chemicals and hydrocarbons in the petroleum industry -- occupational and environmental", at New Delhi on July 19.

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## SHAHJAHANPUR FERTILISER PROJECT

### Oswals to use Snam technology

The Oswals have decided to have the Snam technology for their Rs. 695-crore Shahjahanpur gas-based fertiliser project. Though the decision is understood to have been taken long before they received the letter of intent for the project, the Oswals kept it a closely guarded secret and went through the pretence of studying the various technologies available for ammonia and urea production, company sources say.

Even now, the Oswals are claiming that they have set up an in-house committee of experts to study the comparative merits of the Snam and ICI technologies. However, the sources say that this is nothing but a ploy to keep the ICI in good humour as Oswals are interested in buying its fertiliser unit at Panki, near Kanpur. The day the ICI deal is over, the Oswals will announce their choice of Snam technology for their project, the sources say.

An interesting battle will ensue between the Indian and foreign consultants once the technology choice is made with both trying to grab the role of the prime contractors. The Indian consultants' claim is based on the fact that now they have a long experience in executing gas-based fertiliser projects. They are of the view that all the new projects are duplicates of the earlier projects and therefore they are in a position to undertake the responsibility of the prime contractors.

Their claim is seconded by a subgroup of the Planning Commission on fertilisers, which has said in its report that Indian consultancy firms have been found to possess the required resources and expertise to be given the role of prime contractors in the execution of fertiliser projects during the Eighth Plan. Such a role has not been assigned to these firms. It has recommended that the project owners should be free to select Indian consultants on the basis of their comparative merit. The group has said

that apart from the jobs in India, Indian consultancy firms should obtain jobs in developing and developed countries. India has the necessary talent and experience to undertake such jobs.

In order to enable Indian consultancy firms to acquire a leading position in the field of fertiliser project execution, both in India and abroad, it is necessary that opportunities are first provided to these firms to execute projects in India as prime contractors and thereby develop into consultancy organisations of international repute.

A step in this direction will not only give due recognition to the expertise and resources developed over the years, but also will provide these firms with the much-needed credentials for jobs abroad, the group says. For this, the group says, Indian consultants should be assigned the role of prime contractors for the future projects.

### CHANDRAN APPOINTED CMD OF HFC

Mr. N.B. Chandran, chairman and managing director of the Fertiliser and Chemicals Travancore Limited (FACT) has been appointed CMD of the crisis-ridden Hindustan Fertiliser Corporation (HFC) for two years. Mr. Chandran will have the concurrent charge as part-time chairman of FACT for one year. Orders for his appointment to HFC are understood to have been issued today. It is learnt that his appointment was cleared at the highest level recently.

Mr. Chandran is the seventh CMD of HFC in the past eleven years. Since its inception in 1978, the corporation has seen six other CMDs -- Mr. R. Subramaniam, Mr. R.K. Ghosh, Mr. H.C. Grover, Mr. Pratap Narain, Mr. K.C. Madan and Mr. Sebastian Jacob. Mr. Chandran had steered FACT, which had been written off as a white elephant, out

of the woods. He had taken over as CMD of FACT in 1982.

HFC has cumulative losses of Rs. 755 crores which have completely wiped out its equity capital base. To cut down the mounting losses, the management is of the view that the Durgapur plant of HFC should be closed down. A decision on the closure of the plant will be among the first tasks of Mr. Chandran after he assumes office. HFC is the offshoot of the bifurcation of the Fertiliser Corporation of India.

### FACT NITROGEN PLANT COMMISSIONED

The nitrogen plant attached to the 315 crore ammonium sulphate caprolactum project of the Fertilisers and Chemicals Travancore (FACT) has been commissioned. According to a FACT press release, the plant achieved full capacity production of specified purity on July 11 last. A captive power plant as part of the project had been commissioned earlier.

### TPL EXCEEDS TARGET

Tamilnadu Petroproducts is currently working at 120 per cent of the installed capacity and has produced 33,000 tonnes of LAB during the first six months of the current year. The company has also exported 5,000 tonnes of LAB to China out of 10,000 tonnes order.

The company has also taken steps to export LAB to other countries. The off-take in Tamil Nadu, Karnataka has improved, resulting in lesser freight costs in the distribution operations. The preliminary figures on the operations for the first six months indicate significant improvement in the gross profit margins rising from 34 per cent during 1987-88 to 46 per cent during the period. The company has entered into a collaboration agreement with Henkel of West Germany to manufacture sulphonate-free highly sophisticated and effective detergents/detergent cake.





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## Fertiliser imports to cost Rs. 3000 crores

Fertiliser imports will cost over Rs. 3,000 crores this year, as against Rs. 2,000 crores last year. The sharp increase in the value of imports is being attributed to higher demand for phosphatic fertilisers, firming up of international prices and depreciation of the rupee against other currencies.

The finance ministry feels the upsurge in fertiliser import costs along with the decision to go in for rice imports will put further pressure on the difficult balance of payments position.

Agriculture ministry officials, on the other hand, point to the need for better availability of fertilisers to hit the enhanced foodgrain production targets this year. The official target is 175 million tonnes but the aim is to reach a working target of 183 million tonnes.

Though urea imports are now down to a trickle -- only about one lakh tonnes -- import of phosphatic fertilisers have risen substantially. As against only nine lakh tonnes of di-ammonium phosphate (DAP) imported last year, as much as 25 lakh tonnes is slated for import in the current financial year.

This is much more than the budget estimate of 15 lakh tonnes of DAP import for 1989-90. Fertiliser industry circles say the demand for finished phosphatic fertilisers has risen because phosphoric acid imports have had to be stopped. Foreign suppliers had raised prices to exorbitant levels and the country opted instead for finished fertilisers.

Imports of MOP (muriate of potash) have also risen from 16 lakh tonnes last year to 18 lakh tonnes this year. In addition, fertiliser prices are reported to have firmed up in the international market over the past year. The gradual depreciation of the rupee against major currencies over the last year has also contributed, according to industry sources, to the significant rise in the import bill.

In spite of higher imports, the industry does not anticipate any substantial rise in fertiliser consumption this year. The unusual growth of as much as 21

per cent last year in consumption is not expected to be repeated. This is mainly because the monsoon rainfall has not been as abundant or widespread as last year. Besides, it is felt there was a large pent up demand last year as an aftermath to several recurring drought years.

Fertilisers offtake is thus expected to increase only marginally to around 12.5 million tonnes as against 11 million tonnes in 1988-89.

### 20 OIL-BEARING WELLS IN CAUVERY BASIN

Twenty out of 91 wells drilled and tested in onland and offshore areas of Cauvery Basin have proved to be oil bearing, the Minister of State for Petroleum and Natural Gas, Mr. Brahm Dutt, informed the Rajya Sabha recently. In reply to a question, he said oil is being produced from Narimanam and Bhuvanagiri structures only through early production system at a total average

daily rate of about 236 tonnes and sent to Madras Refineries Ltd. (MRL) by tankers.

The Minister said MRL has submitted a proposal to the Government for setting up facilities for distillation of 5,00,000 tonnes per annum of crude oil and separation of 16,500 tonnes per year of LPG in Cauvery basin. The proposal is being processed, he said. In another reply, Mr. Brahm Dutt said the Government will set up three new grass root refineries in the country.

In a written answer, he said the refineries, one each to be set up at Karnal, Mangalore and Assam, would have an initial capacity of six MTPA, three MTPA and two MTPA, respectively.

The minister said the country's eastern region including Assam, Nagaland, Meghalaya and Tripura, have a higher potential for hydrocarbons than the Bengal basin, Ganga Valley and category three and four basins.

Oil and gas have been discovered in the upper Assam Dhansiri valley and Naga hills.

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## Long-term strategy for rubber development urged

The Governor of Tamil Nadu Dr. P.C. Alexander called for a long-term rubber development strategy based on indigenous natural rubber. Inaugurating the first national conference of the Indian Rubber Institute (IRI) he said the entire natural rubber market in the world would be disrupted if there was political or economic instability in the natural rubber producing nations.

If world rubber prices were to shoot up, the country would face a very difficult situation given the shortage of foreign exchange reserves. If the country faced a crisis, foreign exchange would be utilised for procuring most essential commodities which would leave natural rubber at the tail end of priorities.

Production of rubber was 1000 kg per hectare and with concerted efforts in research, production could be further stepped up. The country could import

"marginally" without upsetting the economics of production.

Based on the current trends of demand for rubber and supply of indigenous rubber, he stated that by 1995 the gap was predicted to be one lakh tonnes and in ten years time 1.8 lakh tonnes. This however was not unmanageable, he pointed out.

He lauded the growth of the tyre industry which registered a 26 per cent growth in 1988. The growth was indicative of the potentialities and expansion possibilities in the next decade. Further the 8.5 per cent growth of the industry last year was commendable considering the problems of the country.

Conference co-chairman Mr. P.K. Bedi called upon industrialists to step up further towards radicalisation which would result in cutting energy consump-

tion by 10 per cent and foreign exchange.

On the production of natural rubber in the country, he said it had increased from 26,000 tonnes in 1960-61 to over 230,000 tonnes in 1988. Productivity had also increased from 365 kg to 1000 kg per hectare. However, the demand for natural rubber had outstripped supply by more than 60,000 tonnes.

Exports had increased significantly from Rs. 46.7 crores in 1982-83 to Rs. 106 crores in 1988-89. This included the earnings from the export of automobile tyres and tubes which had increased from Rs. 10.7 crores in '82-83 to Rs. 76.3 crores in '88-89. The target for export of automobile tyres and tubes for 1989-90 was Rs. 100 crores, he said.

Delivering the key-note address, International Rubber Study Group (IRSG) secretary general, B.C. Sekhar said the Indian rubber industry should go in for globalisation in trade, manufacture and transfer of technology without compromising on quality.

The ISRG had forecast a shortage of 140,000 tonnes of natural rubber this year and 180,000 tonnes next year. With regard to requirement, 7 million tonnes of natural rubber and 14 million tonnes of synthetic rubber will be required by the turn of the century.

Earlier Mr. Alexander, released a book 'Advances in rubber technology'. Welcoming the gathering representative of the Malaysian Rubber Research and Development Board R.K. Matthan said the objective of the conference and three day exhibition was to open technology improvements in the '90s and expand knowledge about the material.

### Rubberexpo 89

The Indian Rubber Institute, a professional association consisting over 1500 members on the technical, marketing and manufacturing function in the rubber industry, organised Rubberexpo

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in association with Dunlop India Limited and MRF Limited. The industrial exhibition, featured progress in rubber materials, machinery, testing equipment and products.

The emphasis of this exhibition was on the technological advances made by the industry in various fields. Rubber-expo 89 featured new applications of rubber, new processing machinery and testing equipment, and up-to-date compounding materials, textile, testing and manufacturing techniques. Over thirty exhibitors, including ten foreign companies and their subsidiaries, took part in the exhibition.

Workshop sessions were also held on technically specified natural rubber usage in tyres, latex examination gloves, footwear, tyre repair technology and materials handling.

### RUBBER CULTIVATION TO BE ENCOURAGED IN WEST BENGAL

The Union Commerce Ministry, through the Rubber Board, will be carrying out an experiment to put West Bengal on the natural rubber production map of the country as part of its efforts to encourage rubber cultivation in non-traditional areas.

Addressing a press conference at Calcutta recently Mr. Priya Ranjan Das Munshi, Union Minister of State for commerce, said the study was conducted by the Rubber Board to locate possible areas in West Bengal suitable for rubber cultivation.

The team identified four areas where rubber could be grown. These were, foothills in the Darjeeling district, parts of the West Dinajpur, Dooars in Jalpaiguri district and some parts of Cooch Behar. The climatic and soil conditions in these regions are believed to be suitable for growing rubber. However, it will take another five to six years for the plants to mature and start yielding

rubber. The West Bengal government has agreed to provide about 70 acres of land near Phuntsholing in Alipuredooar district for experimental cultivation by the Rubber Board, Mr. Das Munshi said.

The Rubber Board is to provide a package of financial assistance to both small and large growers in non-traditional areas. The package includes a Rs. 5,000-per hectare capital subsidy, polybag plant subsidy of Rs. 6 per rubber plant subject to a maximum of Rs. 2,700 per hectare, interest subsidy on NABARD loans and technical assistance and support for marketing.

### DHARAMSI MORARJI

Dharamsi Morarji Chemical Company has announced a dividend of 20% for the 15-month period ended March 1989 (annual basis 16 per cent), against 10% paid last year ended December 1987. The company has turned out encouraging results during the period.

The turnover is up to Rs. 124.14 crores during the period from Rs. 78.70 crores in the previous year, showing an increase of about 27% on an annualised basis. The gross profit has increased to Rs. 595.03 lakhs during the period from Rs. 329.42 lakhs, indicating an improvement of nearly 45%.

After depreciation (Rs. 355.97 lakhs against Rs. 261.08 lakhs) and taxation (Rs. 40 lakhs against only Rs. 1 lakh), the net profit has shot up to Rs. 199.06 lakhs from Rs. 67.34 lakhs, representing over 136% quantum jump rise. The disposable profit is Rs. 228.26 lakhs during the period against Rs. 64.24 lakhs last year after certain adjustments.

The proposed dividend will claim Rs. 128.48 lakhs against Rs. 64.24 lakhs. It has allocated Rs. 50 lakhs against nil to the general reserve. The balance Rs. 49.78 lakhs is to be carried forward against nil. As planned, the company has increased the value of

sales of chemicals to Rs. 51.78 crores during the 15-month period from Rs. 28.14 crores in the preceding year. The sale of chemicals, as percentage of total sales improved to 42 per cent from 36 per cent. The management will endeavour to continue this trend.

The company has completed expansion of its capacity for the manufacture of chlorosulphonic acid at Kumhari to 16,500 tonnes yearly in July 1988 from 3,600 tonnes. It will derive full benefit of this expansion during the current year ending March 1990.

It has converted the letter of intent into an industrial licence for setting up a project at Amreli. It proposes to manufacture 33,000 tonnes of sulphuric acid and 66,000 tonnes of single superphosphate at Amreli. The plant is expected to be commissioned by the end of March 1990.

It has also received a letter of intent for the manufacture at Roha of 200 tonnes per annum of ediphenphos, which is a fungicide. This product is presently imported to the extent of around 100 tonnes yearly. This is an import substitution item and will save foreign exchange.

Besides, the company has obtained a letter of intent for the manufacture of 3,000 tonnes annually of acetyl sulphamyl chloride (ASC) at Kumhari. ASC is used in the manufacture of sulphadiazine, vinyl sulphone and synthetic dyes. At present about 3,600 tonnes of ASC per year is being imported and this will also naturally save foreign exchange.

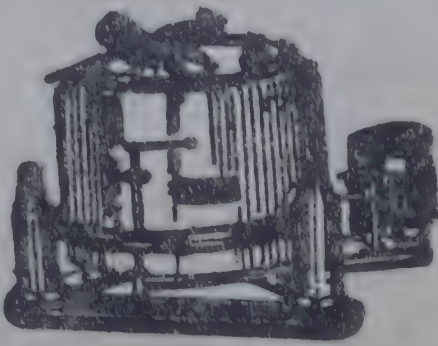
### ALFA-LAVAL

Alfa-Laval (India) had an order backlog of nearly Rs. 80 crs. Business prospects for the current year were good. The company's subsidiary, Saticontrol (India) had established manufacturing facilities at Bhosari, near Pune for various items of process control equipment.



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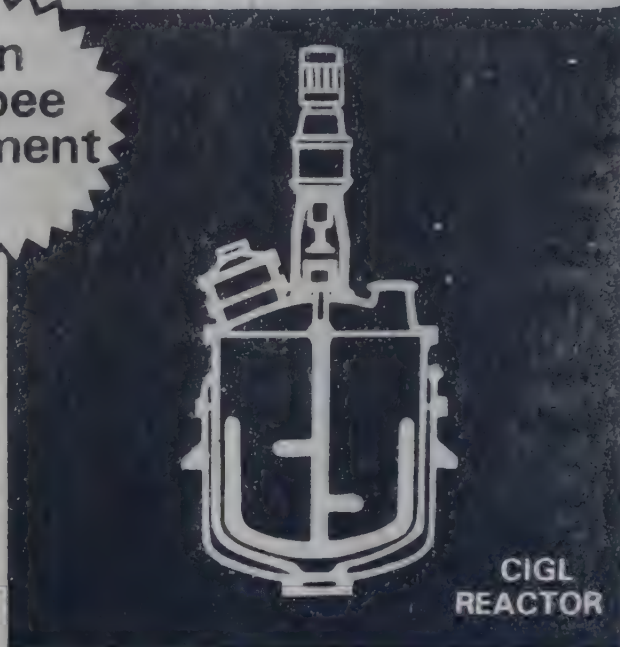
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## No gas grid for South

The Oil and Natural Gas Commission (ONGC) proposes to upgrade the exploration programme in Cauvery, Krishna-Godavari and Tripura basins during the Eighth Plan, the Minister of State for Petroleum, Mr. Brahm Dutt, said in a written answer in the Rajya Sabha recently.

He said the three sedimentary basins have been accorded high priority under the exploration programme and the tempo will continue during the Eighth Plan.

In another reply he said the Government has no proposal at present for setting up inter-state regional gas grids in the north-east or southern regions. Setting up of national gas grid will depend upon finding adequate quantity of gas for transportation through such a facility, he said.

### Gas-based power plants

The Government is willing to clear gas-based power projects provided the Petroleum Ministry assures gas linkages, the Minister for Energy, Mr. Vasant Sathe, said.

Replying to supplementaries during question hour, he said his Ministry is also willing to clear coal-based power projects provided coal linkage is assured.

He said the only way to meet the power shortage in the country is to induct more power and it is proposed to add 38,000 mw in the Eighth Plan. Aid worth Rs. 4,000 crores is being sought from the World Bank for various projects, he said.

Many members expressed concern about power shortages in their States. Mr. Sathe said it is proposed to give a boost to power generation in the North Eastern States. The potential for hydel power in the region is tremendous and according to a study, there is a possibility of adding 20,000 mw in the region.

It is proposed to add a 100 mw unit for Nagaland, he said. The power shortage in the country was 8.9 per cent during April-June last. The power shortage in Delhi alone during the same period was about 1.2 per cent, he said.

### TRIPURA POTENTIAL NATURAL GAS AREA

Tripura has sufficient natural gas reserves to generate 1,000 mw of electricity per day, according to power experts. The experts say eight to ten million standard cubic metres of natural gas can be produced in the State every day which is sufficient to generate 1000 mw.

They say the gas reserves discovered by the Oil and Natural Gas Commission is only a small fraction of the total estimate. The Tripura-Manipur basin holds the promise of becoming the highest reserves in the country in future super giant gas fields.

According to the current assessment the Tripura-Manipur basin is having more than 5000 million tonnes of "equivalent gas". Successful exploration and proper utilisations could "change not only the face of this State but whole of the north-east," they added.

### SOVIET CREDIT FOR SETTING UP POWER STATIONS

The Soviet Union has offered a credit of 1,000 million roubles (approximately Rs. 1,850 crores) to India for establishing power stations and transmission lines. This offer was made by the visiting Soviet Deputy Minister for Foreign Economic Relations, Mr. V.F. Mordukhovich during a meeting with the Union Finance Minister, Mr. S.B. Chavan, at Delhi on July 26. It was also announced at the meeting that an understanding has been reached between the two countries on a three-year agreement on centralised rate of remuneration payable to Soviet specialists in India. The two Ministers also discussed the possibilities of increasing exports of consumer goods from India to the Soviet Union.

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## Rice fields contribute to methane concentration

Rice cultivation is the main reason for the increased methane concentration in the atmosphere. This is the finding of a group of German researchers who studied rice cultivation in Italy for two years. They assume that the amount of methane, a highly inflammable gas, released from this one source is as high as 50 to 150 million tonnes a year.

The researchers working at the Fraunhofer Institute for Atmospheric Environmental Research in their report on "methane from rice fields" say that the main sources for methane in the agricultural sector are rice production and the breeding of ruminants.

They found a clear connection between the amount of methane produced and the fertiliser used. Wherever organic fertiliser in the form of rice straw that had been worked into the soil was employed, the methane concentra-

tion per surface unit and day almost doubled, they say.

Where mineral fertilisers like urea or ammonium sulphate were used, the production of methane was lowered by about 40% as compared to fields that had not been fertilised. The production of rice, which is increasing worldwide, could increase the amount of methane by about two per cent a year, according to those scientists. However, these estimates' accuracy was not finally established as the main rice production areas in Asia have provided very little measured data to the researchers.

Methane is the simplest hydrocarbon consisting of four hydrogen and one carbon atom. Like other trace gases in the atmosphere, it belongs to the group of "greenhouse gases". Though at present the methane concentration in the atmosphere is less than that of carbon dioxide,

1 methane molecule heats up the earth's atmosphere 32 times more intensively than one molecule of carbon dioxide.

The natural decomposition process methane cannot keep pace with the tempo at which the gas is produced thereby resulting in a surplus. According to scientists, the watery environment found in the flooded rice fields and in the stomachs of cattle, a natural habitat for minuscule organisms forms methane as its final metabolic product.

The maximum methane concentrations were measured by the researchers in July, which is probably a result of the processing of the substances released by the plants' roots. The concentrations measured in fallow fields were highest in May, which is considered to be an indication that even organic substances not derived from rice were transformed into methane. The amount of methane produced by ruminants is estimated to be between 70 and 100 million tonnes a year.

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## DMT producers told to cut price

Leading manufacturers have been asked to reduce prices of dimethyl terephthalate (DMT) with immediate effect to Rs. 28,200 per tonne.

The prices of purified terephthalic acid (PTA) will also be correspondingly brought down by 12.5 per cent which is the accepted norm, the sources said. Indian Petrochemicals Corporation Ltd. (IPCL) and Bongaigaon Refinery Petrochemicals Ltd. (BRPL) are also expected to reduce prices of these products.

The sources said the Government decision was taken at a high-level meeting in New Delhi. The meeting had been convened by the authorities at New Delhi on July 26, 1989 to work out a remunerative price on this basis of the recommendations of the Bureau of Industrial Costs and Prices.

The meeting called by the Department of Chemicals and Petrochemicals also reviewed the demand and supply position of paraxylene, the main raw material for the production of DMT and PTA. All the four participants were the consumers of paraxylene, except Bombay Dyeing, which is the only unit solely dependent on imported paraxylene. Its import has been canalised through IPCL. Recently when there was disruption in supply of imported paraxylene, Reliance had loaned around 1,500 tonnes of the material to Bombay

Dyeing. Reliance, IPCL and Bongaigaon Refineries are the only producers of paraxylene in the country.

The working of the remunerative price for paraxylene will lead to the discussions on remunerative prices for DMT and PTA, to be followed up by the working of reasonable prices for polyester staple fibre, POY and PFY. A controversy prevails over the reasonable prices of these products. The consumers of PSF complain about very high prices despite excise concessions and the producers maintain that the present prices are not remunerative.

The Indian Cotton Mills' Federation and Indian Spinners' Association have complained about the hike in price of PSF from the level of Rs. 74-75 to Rs. 89 per kg effected by the manufacturers from June 1, 1989. They have argued that in view of the decline in ruling prices of major inputs, there is no justification for any increase in the price of PSF.

Due to the upsurge in PSF prices their cost to consuming units has far exceeded the level prevailing prior to 1988-89 budget when the excise duty concessions were announced. They apprehend that the consumption of PSF will stagnate at lower levels and it will defeat the objective of the textile policy of increasing the supply of synthetic/blended fabrics to consumers at affordable prices.

PSF manufacturers, however, argue that even on the basis of the BICP study the current market price is much lower. Based on BICP norms, the updated fair selling price of PSF is Rs. 93 per kg at 90 per cent capacity utilisation "while the actual capacity utilisation of the industry currently is 30 per cent, according to the Association of Polyester Staple Fibre Manufacturers (APSFM).

The association has stated that the BICP had done a cost study of the PSF industry in 1985 and based on the then cost of raw materials and utilities, had worked out a fair selling price of Rs. 4 per kg for the old units and Rs. 52.5 for new units. The prices of most of the raw materials have considerably gone up thereafter.

According to APSFM, the cost of DMT has shot up from Rs. 22.41 per kg taken by BICP in 1985 to Rs. 34 at present, that of MEG has jumped from Rs. 17 to Rs. 40 per kg and that of utilities (electricity, fuel, oil etc) from Rs. 5 per kg to Rs. 6.50.

Thus the updated BICP prices would work out to Rs. 73.52 per kg of PSF and when excise duty of Rs. 16.44 per kg, plus sales tax, freight, commission of at least Rs. 3 are added, the total price would work out to Rs. 92.96 per kg, as against the prevailing price of Rs. 84 at 30 per cent capacity utilisation, it has argued.

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## PCL REFINERY

# Many companies keen on participation

Shell International, Essar, Larsen and Toubro and Qatar Tankers are among the parties which have evinced interest in participating in the equity of Bharat Petroleum's Central India refinery project. Several sites have been earmarked in Madhya Pradesh. The choice of location will depend on the area that will not be submerged by the Narmada dam.

This was revealed by the Bharat Petroleum Corporation Chairman, Mr. R.K. Gajree. He said that he expected the work on the Central Indian refinery, which will process six million tonnes of petroleum crude every year, to begin during the Eighth Plan.

## L & T most favoured

Reports from Bombay indicate that Larsen and Toubro Ltd. (L & T) is the most likely private sector partner in the six million tonne capacity grassroots refinery project. According to senior BPCL officials, L & T's edge over others lies in its expertise in oil equipment manufacturing. The private sector engineering giant is said to be one of the four qualified manufacturers of fuel catalytic cracking units, the most critical equipment in refinery. Therefore, it can fabricate and supply all required equipment to the new project on a turn-key basis, it is felt.

While Shell International, whose Burmah Shell was taken over by the government in 1976 to create BPCL and Qatar Tankers with their superior technology have been ruled out for being foreign companies. Essar is likely to lose out on the grounds of not having any expertise, BPCL officials feel.

Other projects which will be carried out soon include the processing of aromatics (by extracting paraxylenes, orthoxylenes and normal paraffins from naphtha and kerosene). A product pipeline to run from Cochin to Coimbatore, and a petrochemical complex. Projects in progress include one for the separation of the C3 stream from cracked liquefied petroleum gas, which will be supplied to IPCL's polypropylene plant at Nagothane.

Effluent discharge facilities which will be upgraded at the Bombay refinery will include the re-circulation of cooling water inside the plant to minimise the discharge of water into the sea. A new oil terminal is to be built at Cochin, with a capacity of 1.54 lakh kilolitres. The total sales turnover of BPCL reached Rs. 4,328.69 crores, with profits before depreciation and tax being Rs. 220.62 crores. The net profit of the Corporation was Rs. 109.09

crores, an increase of 43.46 per cent over the financial year 1987-88. The refinery achieved a capacity utilisation of 102.5 per cent, with 6.15 million tonnes of crude oil processed.

## MEG PRICES HIKED

The price of indigenous mono ethylene glycol (MEG) has been hiked by IPCL and NOCIL. IPCL has raised the price to Rs. 27,500 per tonne from Rs. 25,000 fixed in April. NOCIL has hiked the price to Rs. 27,325 per tonne from Rs. 23,350 fixed by the company in March 1989. The prices are likely to go up further considering the higher landed cost of around Rs. 43,000 per tonne for imported MEG, which constitutes around 80 per cent of the polyester industry's requirement.

## ALKYL AMINES

Sales of Alkyl Amines Chemicals during the first three months of the current year ended June, 1989 amounted to 365.971 MT of amines valued at Rs. 203.53 lakhs compared to 320.068 MT of amines valued at Rs. 205.53 lakhs for the corresponding period of the previous year. In view of the increasing demand for its products, it has undertaken a debottlenecking project to be implemented in 2nd/3rd quarter of 1989 which is expected to increase the company's production and sales.

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## Changes in import duty exemption scheme

The Government has amended the duty exemption scheme. Accordingly, a registered manufacturer-exporter having a minimum annual average domestic turnover of Rs. 15 crores during the preceding three licensing periods but having no or insignificant export performance will also be eligible for issue of a licence under the above provision.

In such cases, the import entitlement will be limited to 10 per cent of the annual average domestic turnover. The notification says "Where no such input-output norm as above exists but a licence has earlier been issued on the input-output norm fixed in an individual case by the Regional Advance Licensing Committee, then the regional licensing authority may consider issue of subsequent licence on repeat basis for the same item based on these norms in favour of the same applicant upto a c.i.f. value of Rs. 25 lakhs each, provided these norms have not been reversed or substituted by other norms either by Regional Licensing Committee or headquarters advance licensing committee or added in Appendix 13-C to this book. This will also include issue of licences under the provision contained in Para-225".

It says "application for issue of intermediate advance licence for making supply of intermediate products against an import-export pass book licence will

be considered in the manner laid down in Paras 227(1), 227(2) and 228(1) above". However, in exceptional cases, the Regional Advance Licensing Committee may consider requests for such enhancement in c.i.f. value without insisting on increase in f.o.b. value in the same proportion, in cases where the c.i.f. value of the licence does not exceed Rs. 1 crore after being satisfied about the genuineness of the grounds provided the value addition after such enhancement is not less than the minimum prescribed in the policy.

Requests for such enhancement beyond the jurisdiction of the Regional Advance Licensing Committees will be considered by the headquarters Advance Licensing Committee," the notification says. Where the applicant seeking issue of an import-export pass book licence is eligible to import an OGL item and also claim duty exemption under this scheme, it will be open to him to import that item in advance and keep it in customs bond for getting clearance against a valid unexpired licence issued subsequently under this scheme.

### ORAL POLIO VACCINE: COMMERCIAL PRODUCTION IN 1991

Commercial production of oral polio vaccine will commence in the country from 1991, the Minister of State for

Science and Technology, Mr. K.R. Narayanan, informed the Rajya Sabha recently. He told Mr. Hari Singh during question hour that to implement and manage research and development for the oral polio vaccine, a new company, Bharat Immunologicals and Biologicals Corporation, was incorporated in March 1989 in the public sector. It is located at Chola in Uttar Pradesh.

A memorandum of understanding for technology consultancy co-operation between the USSR and India for this project has been signed. Land for the project has been acquired. The project's first phase of setting up the factory is under way. Replying to supplementaries, Mr. Narayanan said nearly 66 per cent of the children in India are affected by polio. Since polio cannot be cured it could only be prevented.

### VACCINE PROJECT: MINISTRY PULLED UP FOR DELAY

The Health and Family Welfare Ministry caused unnecessary delay in the manufacture, distribution and utilisation of Japanese encephalitis vaccine, according to the latest report of the Comptroller and Auditor General of India (CAG). CAG observed that the vaccine project, approved by the Government in March 1982, could not be completed within the stipulated period of four years since the imported machinery was found damaged.

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## PATENT, IPR ISSUES

**Delhi's stand gains support**

In direct contrast to the US stand, India has presented its views on patents and other intellectual property rights issues at the GATT committee meeting held at Geneva recently.

India has taken the stand that restrictive and anti-competitive practices of the owners of intellectual property rights could alone be considered under the Uruguay round of negotiations because they "alone impede international trade".

The basic paper circulated stated that there is a close correlation between the level of economic, industrial and technological development of a country on the one hand and the extent of patent protection granted by it, on the other.

Hence, in the case of developing countries, it is of foremost importance that the patent system does not block nor hinder the building up of their own industrial capabilities, the paper has stated.

India's stand is believed to have gained wide support from the developing countries, including Brazil. The paper has also pointed out that it would be inappropriate for the international community to think in terms of a patent regime that focuses merely on the protection of the monopoly rights of the patent owners, ignoring the enormous differences in the economic, industrial and technological development between industrialised and developing countries.

There should not be any imposition on developing countries of standards and principles that may be relevant to the developed countries (but inappropriate to the developing countries), nor should there be an attempt at harmonisation of the patent laws of the industrialised and developing countries.

According to the paper, experience of

developing countries has clearly shown that a patent system can have serious adverse effects in sectors of critical importance to them, such as food production, poverty alleviation, nutrition, health care and disease prevention. The patent system can also have a dampening effect on the promotion of domestic research and development and the building up of domestic technological capabilities. It is, therefore, imperative that the monopolistic rights of the patent owner be adequately balanced by the socio-economic and technological needs of the country, the paper has said.

The paper has further pointed out that a patent law must focus equally on the duties and obligations of the patent owner as well as the remedial steps to be taken to prevent the possible abuse of monopoly rights by him.

In this regard, it has stated that "it should be clearly recognised that patents are not granted merely to enable a patent owner to enjoy a monopoly for the importation of the patented article into the host country or to resort to restrictive and anti-competitive practices".

**SC DIRECTIVE ON GAS LEAK FROM DCM PLANT**

The Supreme Court on July 24, directed the Delhi Legal Aid and Advice Board to put up for prompt disposal before a Lok Adalat to be convened within a month, all claims of the victims of the December 1985 oleum gas leak in the capital from Shriram Foods and Fertilisers of DCM Ltd.

The direction was issued by a division bench comprising Mr. Justice J.S. Verma, Mr. Justice Ranganath Misra when both sides agreed to a suggestion made by the Court to this effect.

The suggestion of the Court came during the hearing of cross writ petitions

filed by Mr. M.C. Mehta, a Supreme Court lawyer, and DCM Ltd.

The claims of about 4,500 alleged victims of the gas leak amounting to Rs. 2 crores were filed by the Board in the designated courts at Tis Hazari under a direction from the apex court.

Since it would take many years for the designated courts to decide the claims, Mr. Justice Misra and Mr. Justice Verma suggested that all the claims should be put up before a Lok Adalat.

The Court observed that those of the victims who were willing to avail the forum of the Lok Adalat should approach the Board for the purpose. The Court directed the listing of the petitions for further hearing on August 28.

**THERMAX BAGS WATER MISSION CONTRACT**

Thermax Ltd. has bagged a Rs. 10 crores contract from the National Water Technology Mission for Drinking Water, for setting up 43 desalination plants in remote villages which do not have any source of potable water.

The Pune-based company had developed a complete range of desalination systems based on reverse osmosis and electrodialysis technologies. The company is also engaged in national priority areas of energy conservation, engineering exports and environment protection.

The company will begin operation of 20 desalination plants by December 1989 and the remaining by the middle of next year. The plants have capacities ranging from 10 cubic metres a day to 100 cubic metres a day which can cater to the needs of 1,000 to 10,000 people.

The desalination plants will come up in the problem villages of Rajasthan, Andhra Pradesh, Tamil Nadu, Gujarat, Maharashtra, West Bengal and Haryana.



## MMTC ACHIEVES BREAKTHROUGH

# Iron ore to be exported to Australia

The Minerals and Metals Trading Corporation (MMTC) has achieved a major breakthrough in the export of iron with the signing of a contract for export of about 1.5 lakh tonnes of iron ore to Australia.

This is the first time that MMTC is carrying coal to New Castle since Australia itself is the second largest producer and exporter of iron ore in the world. The iron ore to be exported to Australia is valued at Rs. 4 crores.

Earlier, MMTC had exported iron ore pellets from Kudremukh to Australia on trial basis. However, it is for the first time that India will be exporting iron ore lumps to Australia. Shipments against this contract have been planned from Paradip port.

Working on the premise that export of iron ore from India to certain destinations in Australia makes commercial sense, MMTC has been pursuing this proposal for quite some time.

Initially, a sample was sent to ascertain technical suitability of Indian ore for Australian steel mills. The sample met all the rigorous tests carried on it and was found acceptable for quality steel production in Australia.

This was followed by a visit of an Australian team to Paradip port organised mainly to apprise the buyers of the facilities, organisation and infrastructure support available at the port for the export of iron ore.

During this period, techno-commercial discussions continued between the two sides to thrash out a workable proposal so that the iron ore supply to Australia could be carried out on a long-term and sustained basis.

MMTC was quick to realise that Australia might look to India for iron

ore lumps since most of the production in Australia is that of fines. Moreover the steel production in the world is going up pushing up the demand for the high-grade Indian iron ore.

It is learnt that Japan, South Korea, Romania, GDR and China now want increased quantities of Indian iron ore. However, the port and rail capacities are the major constraints facing MMTC in this regard. Only the Goa sector is free from these constraints but this sector mainly produces low-grade fines. The other sector is the Paradip port, but this port cannot take larger vessels.

During 1988-89, Australia exported 80 million tonnes of iron ore. It was second only to Brazil which exported around 100 million tonnes during the year.

India exported 17.64 million tonnes of the iron ore last year. It exported 10.4 million tonnes to Japan, 3.1 million tonnes to Korea, 2.35 million tonnes to Romania, 0.15 million tonnes to China, 0.34 million tonnes to Pakistan and 0.60 million tonnes to GDR.

## SPECIAL PUBLICATIONS FROM BIS

The Bureau of Indian Standards have published a series of reports under the category of special publications. The following are some of the relevant publications:

1. SP: 6(6)-1972 Application of plastic theory in design of steel structures.
2. SP: 8-1970 ISI Handbook of mathematical, physical, chemical and engineering tables (with amendment No. 1)
3. SP: 9-1973 Technical data sheet for gases conveyed in cylinders (with amendment No. 1). (Reaffirmed 1986)
4. SP: 11-1973 Recommended SI units

- for textiles (Reaffirmed 1987)
5. SP: 12-1975 ISI Handbook for g welders
6. SP: 13-1976 Guide to the principles of geometrical tolerancing (Reaffirmed 1987)
7. SP: 15-1981 ISI Handbook of tiles testing
8. SP: 18 ISI Handbook of food analysis
9. SP: 18 (Parts II, III & IV)-1984 Sugarcane and honey; Edible starches and starch products; and foodgrains and foodgrain products.
10. SP: 18 (Parts V, VI & VII)-1984 Bakery and confectionery; Protein rich foods and spices and condiments.
11. SP: 18 (VIII, IX & X)-1984 Fruit and vegetables stimulant food, alcoholic drinks and carbonate beverages.
12. SP: 18 (Part XI)-1981 Dairy products
13. SP: 18 (Parts XII, XIII, XIV & XV)-1984 Meat, fish and poultry oils and fats, food colours; miscellaneous products.
14. SP: 29 (Part 1)-1985 Handbook of Industrial Fasteners.
15. SP: 29 (Part 3) Handbook on Industrial Fasteners.

For more information contact Bureau of Indian Standards, City Sales Office, Novelty Chambers (Third Floor), Grant Road, Bombay-400 001

## POWER CUT ON HT UNITS IN TAMIL NADU REDUCED

The power cut for HT industries has been reduced to 20 per cent from 40 per cent from July 25. A TNEB spokesman said the power cut was reduced in view of the improved storage in hydro reservoirs and power generation. The power position will be further reviewed by September end. Inflows into the hydro reservoirs in Tamil Nadu continue to be quite substantial, with the combined storage reaching an equivalent of 1,155 million units against the total capacity of 2,200 million units.



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## KMML stir: Rs. 12 crore loss

A 20-day-old strike by a section of workers of the State-owned Kerala Minerals and Metals Limited (KMML) at Manavara near Quilon, has cost the company dearly, further worsening the situation faced by the titanium industry. The immediate production loss to KMML alone is estimated at around Rs. 12 crores, according to the management, says a report in 'Financial Express'.

The titanium industry in Kerala has been hit, following stiff competition by units manufacturing titanium in other states. Until recently, the State had a virtual monopoly in titanium. But KMML and Travancore Titanium Products (TTP) are facing severe threat from the proposed 50,000-tonne capacity titanium unit to be set up by the Government in Maharashtra. The crisis would further worsen, if the proposed Tamil Nadu Government's unit at Manavalakurichi, with British collaboration also comes on stream shortly.

Against the above background, KMML has an uphill task ahead. Ironically, the labour strike has played havoc with KMML, when the company which had been in the red had begun to reverse the trend of accumulating losses. KMML had an accumulated loss of Rs. 60 crores. The loss in 1987-88 was Rs. 16.5 crores. But this year, the company was originally estimated to make a profit of Rs. 3 crores. Last year too, KMML showed positive results. However, this year, the financial performance will be badly affected by the strike and the resultant shut down. The daily loss to the company as a result of the shut down is estimated at Rs. 60 lakhs.

The action taken by the management against three employees, in connection with the gas leak from KMML in May, had provoked the strike. One died as a result of the leak. Based on the probe report, three employees were placed under suspension by the management. Defending the action taken by KMML

management against the three employees in connection with the gas leak, the State Industry Minister, Mrs. K.R. Gowri, said that there could be no lapses on the part of the company management in regard to safety arrangements at this chemical unit. The demand of the workers unions that the suspension of the three employees should be withdrawn forthwith, was unreasonable which could not be accepted under any circumstances, she said.

She also pointed out that the management's offer to review the action once the investigation was complete was also not acceptable to certain employees' unions. She alleged that behind the strike there was a conspiracy by vested interests to ruin KMML.

However, the Congress (I) leader and the President of KMML Employees Congress, Mr. Vayalar Ravi, has blamed the management and the Government for the crisis in KMML. According to Mr. Ravi, the person who was authorised by KMML management to probe the leak was not even a chemical engineer. He said that immediately after the blast and the leak on May 27, the representatives of Factories and Boilers Inspectorate, including its Joint Director, had made an on the spot study and came out with a report in which the management was asked to explain. They had even threatened to prosecute KMML management if explanation was not furnished by June 30. The enquiry by KMML management, which Mr. Ravi dubbed as farce, followed the firm stand by the Inspectorate of Factories and Boilers which culminated in the suspension of three innocent employees.

Mr. Ravi said that the employees had warned the management in advance, that the tickle transfer pump of the plant where the blast occurred, was faulty and that it had to be replaced. Meanwhile, the State Government had decided to provide full protection to loyal employees at KMML, with a view to resuming

operations at the factory. The State Industry Minister has also appealed all workers to report for duty as according to her the very survival of the company was at stake.

## LANKA SELLING ILMENITE, RUTILE AT BELOW MARKET PRICES

The cash-strapped island of Sri Lanka is rich in two key titanium ores -- ilmenite and rutile -- but is selling them to the world at well below market rates. Earlier last month, Sri Lanka's parliamentary sub-committee for industries recommended that the government call for worldwide tenders for the sale of the two minerals.

The call came as opposition politicians, economists and businessmen sharply criticised the export policy of the country's Mineral Sands Corporation, which handles the production and export of ilmenite and rutile. They claimed the corporation was allowing one major Sri Lankan-based multinational firm to control the export of the two minerals, resulting in huge losses to the country.

A prominent politician who did not wish to be named said Sri Lanka was losing at least 40 dollars on every tonne of ilmenite exported, adding that this money was going "into the pockets of the middlemen". Sri Lanka exported 74,305 tonnes of ilmenite in 1988. This put the possible loss at just under three million dollars, he pointed out.

Titanium is an indispensable metal in the aerospace industry. It is used primarily in the production of compressors for aircraft gas turbines as well as for structural components in military and commercial aircraft and space vehicle systems. Observers point out that demand for ores of the metal will continue to rise in the foreseeable future. The world titanium industry has notched an average compound growth rate of 9% per year since its inception in 1950.



## Orissa Mining Corporation plans massive expansion

The state-owned Orissa Mining Corporation proposes to expand its activities in the processing and industrial sectors including sponge iron, pig iron and white cement, in the next few years, besides expanding and modernising its mining operations in iron ore, chromite and manganese. A total of Rs. 100-crore investment has been proposed.

After setting up its first industrial manufacturing unit, the Rs. 60-crore 100% export-oriented charge chrome unit at Bamnibal through its wholly-owned subsidiary CMC Alloys Ltd., the corporation has now started implementing a Rs. 18-crore chromite ore beneficiation plant at its South Kalipani mines in the Sukinda Valley in Cuttack district. IDBI has sanctioned assistance of Rs. 11.6 crores for the project which will process 1.5 lakh tonnes of low-grade ore to produce 80,000 tonnes of high-grade concentrates. The unit, to be commissioned in July 1990 will partly cater to the export market, according to Mr. N.C. Das, managing director of OMC.

At present only the Ferro alloys Corporation (Facor) operates a chromite beneficiation plant, of smaller capacity, while TISCO is setting up a plant. OMC Alloys Ltd., which was commissioned in 1986, makes use of low-grade fines which were going waste for long to produce charge chrome. OMC's beneficiated ore will be of higher grade than required for its subsidiary and hence will be available for export.

Mr. Das disclosed that OMC will team up with the state owned Industrial Development Corporation of Orissa Ltd. (IDCOL) to set up a 50,000-tonne capacity chromite briquette plant to feed the domestic ferro chrome industry. A project report has been prepared for the briquette plant which will be located either at Jajpur Road where IDCOL's low-carbon ferro chrome unit is located

near OMC's chromite mine and beneficiation plant. Investment decision on this Rs. 9-crore project is likely this year. It will need imported machinery but no foreign collaboration.

OMC will also implement this year a Rs. 2-crore China clay washery project at Karanjia in Mayurbhanj district. The unit will process 22,000 tonnes of high-grade China clay available in the area to produce 7,500 tonnes of ceramic grade material and filler grade material used in the paper and rubber industries.

OMC is taking assistance from the Hindustan Diamond Corpn. to set up a lapidary unit and a gem park. Compact facilities for buying the precious stone roughs available in the western belt in Orissa, cutting and polishing and for making deals with importers will be installed in the park which will cost Rs. 1 crore. Another Rs. 1 crore unit for granite polishing is also on the anvil.

The projects proposed in the Eighth Plan include a Rs. 15-crore 45,000-tonne capacity white cement unit to exploit the high grade limestone deposits of Sunki in Koraput district. OMC has dropped the earlier proposal for a mini cement plant in the joint sector with a private promoter on a reappraisal by IDBI.

Investment decision is also to be taken on setting up sponge iron and pig iron projects to fully utilise the Daitari iron ore deposits, estimated at 50 million tonnes. IDCOL and private sector Orissa Sponge Iron Ltd. will be associated with these projects. IDCOL at present operates a pig iron plant at Barbil in Keonjhar district, while OSIL produces sponge iron at Palaspanga in the same district.

In the mines sector, OMC will take to massive mechanisation in order to mine upto 100 metres depth and avoid

wastage of ore. It has appointed M. Dastur and Co. as consultants for mines expansion and modernisation projects. The mines at Daitari will be expanded to accommodate the need for RSP modernisation as also feed the proposed sponge iron and pig iron plant and the expected Hyuandai container linked with Paradeep port expansion. Production of manganese, now varying with the consumption pattern, will be stabilised at a higher level of two lakh tonnes in view of location, export markets and long-term tie-up with steel plants. Chromite production, which has reached 4 lakh tonnes at present, will be stabilised at 5.5 lakh tonnes.

OMC has also a proposal to undertake processing of the tin ore deposits in Koraput with foreign expertise.

### FOUR MORE ATOMIC POWER STATIONS PLANNED

The Centre has decided to set up four more atomic power stations at Kaiga (Karnataka), Tarapur (Maharashtra), Rawatbhatta (Rajasthan) and Kudankulam (Tamil Nadu), the Minister for Science and Technology, Mr. K.J. Somaiya told the Lok Sabha. The decision was taken on the recommendation of the site selection committee of the Department of Atomic Energy. He said the Government did not plan to scrap the two nuclear power reactors at Kalpakkam, now operating at a lower level of 100 MW each. The units have been plagued by technical snags.

### ADDITIONAL HEAVY WATER PLANTS PROPOSED

The Government proposed to set up additional heavy water plants for meeting the anticipated requirements of nuclear power stations, the Minister of State for Atomic Energy, Mr. K.R. Narayanan, said in the Rajya Sabha. The Department has also chalked out a long-term programme for production of heavy water for atomic energy programme.



# MMTC to curtail supply of lead

The Minerals and Metals Trading Corporation (MMTC) has decided to allow only 75 per cent of the entitlement of lead to user industries. This decision will be applicable from July.

With this, lead has joined the group of non-ferrous metals, the supply of which has been curtailed by Minerals and Metals Trading Corporation because of the non-availability of foreign exchange for their import.

For the past six months, MMTC has been supplying 30 per cent of the entitlement of copper to the semis and alloy sector, 60 per cent to the winding wire industry and 100 per cent to some public sector units like BHEL and NGEF.

Another non-ferrous metal, zinc, is being given at the rate of 60 per cent of their entitlement to all user industries. Regarding lead, as against the actual requirement of about 40,000 tonnes, MMTC was allowed to import only 24,000 tonnes last year. However, with the carry forward stock, the actual sale of lead came to 28,000 tonnes.

This year, while the demand for lead has gone up, the government has sanctioned foreign exchange for the import of only 24,000 tonnes. This implies that the user industries like the battery man-

ufacturers, will face an increasing shortage of the metal this year.

In response to the industry's demand, MMTC has been approaching the government for additional foreign exchange for the import of lead. However, because of the foreign exchange constraint, MMTC could not get additional allocation of foreign exchange.

Normally, if the canalising agency is unable to supply the material then it should give a no-objection certificate to the users so that they may import it directly. But, knowledgeable sources say that direct imports will also mean outgo of foreign exchange which is being denied to the canalising agency.

India's import policy stipulated that if a canalising agency is unable to import because of foreign exchange constraint, it may not issue the no-objection certificate. It is now being widely feared that the free market prices of most of these metals will start rising steeply in the second half of 1989-90.

There is also an apprehension that while the indigenous industry using these non-ferrous metals will be working in low capacity because of the shortages, India may end up importing finished value-added items at a much

higher cost so that certain projects using these items do not get delayed.

## Exports up by 90 per cent

Meanwhile the non-canalised exports of MMTC shot up by 90 per cent during the first quarter of the current fiscal (April-June 1989) year over the corresponding period of the previous year.

According to the figures available at New Delhi, overall exports galloped from Rs. 125.6 crores to Rs. 200.4 crores during this period showing an increase of 59 per cent. The turnover, too, showed an increase of 31.7 per cent over the same period.

Soon after assuming charge of MMTC, Mr. I.P. Hazarika, chairman, created a separate division exclusively for non-canalised exports. The regional offices were also restructured and, for the first time, export groups were created in each of these offices. This is learnt to have given the necessary thrust and impetus to the export efforts of the corporation.

During the first quarter of the current year, both canalised and non-canalised exports have been buoyant. Diamonds, gems and jewellery exports have shown an increase of 166 per cent. Agricultural, industrial and chemical exports also contributed to the record performance.

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# Highlights in Chemical Technology (Part 1)

## CONTINUOUS PROCESS BASED ON ELECTRODIALYSIS FOR LACTIC ACID

The process to produce lactic acid via which glucose fermentation may be replaced by a process developed by ICI and Darcel Chemical Industry engineers. They demonstrated recently a continuous process that separates the lactic acid by electrodialysis, a remarkably more efficient system than the current low production rate, elaborate separation system. Pushed on by increased cell density, the continuous process raised the fermentation rate from 2-3 gm/l/h to 25 gm/litre per hour. Required cell separation by microfiltration before the anion exchange, resin membrane - mediated electrodialysis moves the lactic acid.

The electrodialysis product stream contains upto 300 gm/l product. An added benefit of the electric field seemed to be a bactericidal one, for the system remained free of contamination by other bacteria even though the system was operated for 5 weeks in a non-sterile manner. The effect of electrical fields has been reported before. (*Chemtech*, 4/1989, p. 199).

## ADVANCE IN BATTERY TECHNOLOGY RENEWS INTEREST IN ELECTRIC VEHICLES

Much advance in USA, Japan, UK has been reported in recent years. In the most recent example, Chloride Ltd., (the world's largest maker of rechargeable batteries in Britain) and General Electric started jointly to develop a sodium-sulphur battery in the 1970s.

The new sodium-sulphur battery can now double the range of electric vehicles to 150 miles before recharging,

reports Dr. Michael Mangan of Chloride Silent Power (a subsidiary of Chloride Ltd). Lighter than standard lead-acid batteries, the new batteries will also allow for truck design with payloads 70% greater than on present electric trucks.

Chloride Ltd. is planning to build a pilot plant to manufacture 5,000 sodium-sulphur cells per week. The flashlight-battery sized cells can be assembled together in packs in any number to make different-sized batteries for electric vehicles of varying specifications. Dr. Mangan estimated recently that a dry - cleaning van, for instance, might contain 2500 cells or the equivalent to 50 kilowatt-hours of stored energy.

He noted that the theoretical energy density of sodium sulphur batteries is 300-350 watt hours per kg (2.2 lb), which is a ten fold improvement over lead-acid batteries in energy-weight ratio. The new batteries can be recharged in half the time of lead-acid batteries and are expected to provide 5 years of maintenance free life.

The new batteries operate at a temperature of 350°C in order to liquefy the electrodes of sodium and sulphur. Because these chemicals are highly reactive, capable of releasing up to 1000°C of heat, safety features prevent them from mixing in significant quantities even at very high impact. Enthusiasm for electric vehicles has grown to the point that three Grand Prix electric car races are held annually in Europe. A new speed record, 180 miles per hour was recently achieved on an electric motorcycle. There is new interest in advanced countries and the market is demanding electric vehicles for commercial uses. In the USA, Chloride Ltd., marketing experts will be targeting the

city delivery van market of one million vehicles annually, expecting to carve out a modest sales niche of 20,000 vans per year. Sales will be concentrated in the 5 largest American cities.

Although the battery powered vans will sell at twice the price of gasoline-powered vans, the two-fold savings attraction of longer life and lower maintenance should convert enough buyers to achieve the company's expectations.

Electric vehicles' efficiency in city driving in terms of miles per watt-hour stored versus miles per gallon is nearly eight times greater than that for gasoline (petrol) powered vehicles. Further electric vehicles greatest advantage in the long run is that they do not pollute the environment. (*Science Focus*, Vol. 5, No. 3, pp 4-5).

## A REPLACEMENT FOR BERYLLIUM OXIDE IN ELECTRONICS UNVEILED BY UNION CARBIDE

Sometime back the US Department of Defence declared beryllium oxide as a hazardous material. This spawned a search for a suitable replacement. Recently, Union Carbide unveiled such a replacement.

Researchers at Union Carbide's Parma Technology Centre, Cleveland, report that hexagonal boron nitride appears to meet the necessary requirements as a replacement, and in some areas even out performs beryllium oxide.

For example, hot pressed boron nitride has a higher operating temperature, a lower dielectric constant and a higher dielectric strength than BeO does. It is also easier to fabricate and machine than beryllium oxide. (*Res. & Dev.*, 1/1989).



## A SMALLER SCALE 'SAFE INTEGRAL REACTOR' (SIR) TO BE DEVELOPED BY AN INTERNATIONAL TEAM

Safe Integral Reactor or SIR is the name of a new breed of 300-MW pressurized water reactors to be developed by an international team. Taking part are Combustion Engineering, Windsor, Conn., Stone & Webster Engineering, Boston, the UK Atomic Energy Authority and England's Rolls Royce and Associates. Each partner will bring in, its particular set of skills and expertise to the project.

SIR components will be housed in a large pressure vessel, much of it below ground level rather than being dispersed in a loop arrangement as they are in conventional PWRs. This will result in savings in installation costs and construction time without sacrificing safety aspects of operation. A likely site for the first SIR is Winfrith, UK. (*C & EN*, 1/16/89, p. 30).

## DSM TO COMMERCIALISE DYNEEMA FIBRE

Dutch chemical producer DSM is building a commercial-size plant for its superstring Dyneema polyethylene fibre. Initial capacity of the plant at Heerlen, Holland, will be several hundred metric tons per year. Capacity will be expandable, if needed to several thousand metric tons by the mid-1990s. The Dyneema plant will be accompanied by a new plant to produce ultra high molecular weight polyethylene, the starting material for the fibre. This plant will have a capacity of about 5000 tonnes per annum. Both plants are scheduled to be onstream by the end of 1990. (*C & EN*, 1/16/89, p. 14).

## TWO TECHNOLOGICAL REVOLUTIONS IN FLAT GLASS INDUSTRY

The flat glass industry has undergone

two technological revolutions in the 20th century reports Roy. W. Yunker of PPG Industries. The first of these according to Yunker, occurred in the period between the two world wars and transformed flat glass manufacturers from a batch process to a continuous one. It also saw the development of several commercially successful sheet glass production techniques such as the Coburn, Fourcoul and Pittsburgh processes. In addition flat glass manufacture was developing to the point of having the technology for continuous twin grinding and polishing of the plate glass ribbon in commercial use by the start of World War II.

The second revolution, which took place during the last 30 years was the development of float glass technology -- development of processes for forming flat glass on a substrate of molten tin. The flat glass industry, in recent years, has put added emphasis on value-added products.

Some of these include laminated safety glass, bullet-resistant glass, double and triple lite insulating units, radiation shields, air-craft transparencies, photographic glasses, solar glasses, low emission and/or high transmission glasses, glass block, shower doors, table top glass and appliance glass. ((a) *The Handbook of Glass manufacture* Published by PPG Industries, (b) *Glass Ind* 2/1989, p. 15).

## MICROFINE GLASS PARTICLES EMPLOYED FOR CLEANING MONUMENTS

Microfine glass particles of specified size have been developed in France for cleaning monuments. The new material is said to eliminate the defects inherent in extremely corrosive techniques, such as sand blasting and chemical action, that are currently used. The microfine glass particles vary between 200 and 500 microns in size and are designed to be sprayed on dry. (*Glass Ind.*, 2/1989, p. 5).

## DIAMOND CRYSTAL GROWN EPITAXIALLY ON SILICON

Researchers in Israel and (USA) have taken an important forward toward diamond conductor devices by showing that diamond films can be grown epitaxially on silicon at room temperature. Diamond films 0.7µm thick were deposited by bombarding the substrate Si (111) with a beam of 120 eV carbon ions. These experiments confirmed the epitaxial growth of cubic diamond on silicon that is, the diamond (111) and (112) planes are parallel to the Si (111) (220) planes, respectively.

Researcher J. Wayne Rabalais of University of Houston, who heads the project believes the diamond film will grow by a process he calls subplantation. The carbon ions become implanted just beneath the silicon surface and begin forming an oriented sub-surface film, he explains. The surface silicon atoms are slowly eroded away by sputtering and diluted by non-mixing processes. The final diamond film consists of small crystals fitted together like mosaic blocks measuring at least 150 nm on a side. The goal of the work, Rabalais says, is to grow perfectly oriented single crystal diamond films for electronics application. (*C & EN*, 2/27/89, p. 20).

## NON-CONJUGATED POLYMER CONDUCTS ELECTRIC CURRENT

A conjugated backbone of alternating single and double bonds has been considered an essential structural feature of conducting polymers. Now in stark contrast to the conventional wisdom, researchers at AT & T Bell laboratories have prepared conducting polymers in complexes that have isolated double bonds.

Researchers found that natural rubber (cis-polyisoprene) becomes conducting



doped with iodine. The doped polymer has a conductivity of about  $10^{-1}$   $\Omega^{-2}$  (ohm-cm) $^{-1}$ , 10 orders of magnitude higher than the untreated material. Therefore, researchers conclude that conductivity is primarily electronic, with charge carriers hopping between sites on different polymer chains.

Trans-Polyisoprene and poly(3-dimethylbutadiene) also become conducting when treated with iodine, but unsubstituted polybutadiene does not. Therefore, researchers conclude that electron-releasing groups are a key factor. (*Macromolecules*, 21, 66, 1988).

## ODOUR-ABSORBING MOLECULAR SIEVES ON THE HORIZON

Union Carbide has developed a new family of synthetic molecular sieves that have a strong affinity for organic odour molecules and are not inactivated by moisture. They are marketed under the trade names of Abscents and Smellnite for deodorizing applications. However, they will have one disadvantage, they will absorb good odours as well as bad. The sieves are highly selective for odorous compounds. They are effective with many different types, including organic acids, aldehydes, ketones, mercaptans, ammonia, amines and indoles. Such compounds are removed to very low concentrations and they are not released to the atmosphere.

The new family of molecular sieves is being evaluated in a number of products. For personal care products, Carbide offers the molecular sieves under the trade name Abscents. Potential applications include foot and body powders, underarm deodorants, menstrual pads and hair care products.

For other applications, the odour absorbers will be sold under the Smellnite name. Potential uses are in air deodorizers for rooms and refrigerators, and deodorizers for carpets, upholstery and for household pets.

## A COOLER ROUTE TO SUPER-CONDUCTIVITY

Du Pont researchers have found a way to make the superconductor yttrium-barium-copper oxide ( $\text{YBa}_2\text{Cu}_3\text{O}_6 + \text{X}$ ) as a fine-grained powder under less drastic conditions. The conventional solid-state synthesis of this so called 1-2-3 material typically involves heating an intimate mixture of yttrium oxide, copper oxide and barium carbonate to 950°C. The procedure produces a powder with large particles and poor vulnerability.

Du Pont researchers were able to lower the synthesis temperature substantially by avoiding the use of barium carbonate, an ingredient that also causes other problems. The new synthesis involves carbon-free hyponitrite precursors or hydrated metal oxides derived from the hydrolysis of organo metallic solutions. These precursors decompose at 650 to 700°C in an inert atmosphere to produce the reduced form of 1-2-3. Subsequent oxidation of this material at 400°C yields submicrometer-sized particles of 1-2-3 that become superconducting at about 87K. The powders have predominantly smooth and clean grain boundaries, the researchers note. (*C & EN*, 1/9/89, p. 27).

## LOW WATER ABSORPTION POLYAMIDES LAUNCHED BY BAYER

Bayer AG West Germany, has recently launched an improved generation of glass fibre reinforced polyamide 6 and 66 grades, reducing water absorption by 30% over corresponding general purpose grades. Designated Durethan RM, there are four grades available incorporating good flowability, allowing longer flow paths and lower wall thickness or a lowering of melt temperatures reducing thermal damage during processing. Durethan exhibits good dimensional stability and a refined surface finish. (*Design Engine-*

*ering*, 1/1989, p. 69).

## THE SECOND EDITION OF SURFACTANT MONOGRAPH PUBLISHED IN USA

The second edition of 'Surfactant & Interfacial Phenomena' which has been recently published in the USA provides an informative treatise on the subject. The decade since the publication of the first edition of this monograph has witnessed an explosion of interest in surfactants and their applications to a multitude of products and processes. There is an intense interest in surfactants in such high technology fields as microelectronics, electronic printing, magnetic recording and biotechnology. This interest has produced an increase in fundamental knowledge of these materials and their interfacial and colloidal properties.

New sections have been added to the volume and original sections expanded on such topics as micro-mini-and multiple emulsions, liquid crystal formation, hydrotrophy, steric forces in the stabilisation of dispersions, lime soap dispersing agents, fabric softeners and many other topics. (*Surfactants & Interfacial Phenomena, Second Edition, By Milton Rosen; Cloth 6 by 9 inches, 431 pages, John Wiley & Sons Inc. Wiley Drive, Somerset, N.J., 008875 - 1272, Price \$ 49.95.*)

## TRIALS CLEARED FOR MALARIA VACCINE

MicroGeneSys (West Haven, CT) is starting up clinical trials of its malaria vaccine VaxSyn PfCSA at the University of Maryland (Baltimore). The vaccine targets the "most prevalent and lethal form" of the disease, caused by *Plasmodium falciparum*. President Franklin Volvovitz says the vaccine, which is based on a protein that is similar to the parasite's surface proteins, may "evoke a more complete immunity compared with earlier candidate vaccines based on protein fragments."



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# Chemical Plant Developments

JAMES LOCK

Consultant-Editor, 'Processing', London

## DISTRIBUTED CONTROL SYSTEMS

Transmitton Ltd., a subsidiary of ICC PLC, has incorporated its distributed control systems (DCS) capability into its new Cromos 32-bit multi-processor master station. The Cromos master station offers facilities to network workstations, with fully intelligent 16-bit Microtel outstations which run the latest release (version III) of Transmitton's Microflex control language.

This DCS capability allows control to be developed from the central station to the outstation, thus freeing the master station from having to run complex process packages. It also enables the outstation to continue working should communications be lost between it and the master station.

At outstation level, the new 16-bit central processor card uses the latest large-scale integration (LSI) technology and has up to 1 megabyte of memory. The processor has been designed to be retrofitted on all existing Microtel outstations, which enables users to enhance and upgrade their systems easily.

Cromos is available as:

- \* A personal computer (PC) for low level entry.
- \* A mid-range version for 5000 to 10000 point installations.
- \* A fault-tolerant 32-bit system with input/output point counts measured in tens of thousands.

The top-end version has a flexible alarm package, independent databases, and the facility to interface to Ethernet for external data processing. Software design ensures a fast response time to plant events. Control programs are developed graphically on an off-line PC using software that is compatible with

GEC's GEM desktop environment. Comprehensive off-line testing facilities are provided to enable input, output or intermediate values to be monitored, and allowing modifications and developments to be implemented with the minimum cost and delay. Using this new outstation technology, Transmitton has undertaken projects for gas distribution control and pipeline integrity, and monitoring for the oil industry, as well as other applications which include a new water treatment works.

### Gathering Centre Extension

Fifteen Transmitton Microtek 700 remote terminal units (RTUs) will be used in British Petroleum's current expansion of the Wytch Farm oilfield in Poole Harbour, Dorset, in southwest England. The RTU system, which was installed in May this year, will provide the telemetry for the remote well sites and export pipeline, and will interface with Fisher Control's Provox DCS at the central gathering station at Wytch



Transmitton's new Microtel outstation, with a 16-bit central processing units (CPU) card, the latest LSI technology and up to 1 megabyte memory, has a processor designed for refitting to all Microtel outstations.

Farm. Last summer, approval was given for a ten-fold increase in production up to 66,000 barrels/day of oil, together with exports of gas.

The single largest part of the expansion project is the extension of the gathering centre. There, the mixture of oil, gas and water that comes in from eight well sites is separated, stabilised and sent 90 km to the east by pipeline to a terminal on Southampton Water.

Methane gas will travel by another pipeline to a British Gas terminal and then into the Southern Gas network, while propane and butane gas will go through two more pipelines to another terminal for onward distribution by rail. Water is returned to the well sites, after treatment, for reinjection into the oil reserves.

The Microtel system monitors and controls facilities for the unmanned well sites and for the 90 km pipeline, as well as for a duplicated telemetry link to the BP oil terminal and to the Esso refinery at Fawley, on Southampton Water. The application is unusual in that it requires the extraction and separation of oil, gas and propane on site, with a complex instrumentation system for the process units.

For further information contact: Transmitton Ltd., Smisby Road, Ashby De la Zouch, Leicestershire, United Kingdom, LE6 5UG.

## PUMP FOR DIFFICULT VISCOUS MATERIALS

The Hidrostal pump, made by Hidrostall Process Engineering, handles effectively high volumes of problematical viscous material. The screw centrifugal impeller of the Hidrostal, with its open channel design, combines the



clog-free features of a vortex pump with the high efficiency of a centrifugal pump and the gentle action of a screw pump. In thick materials the impeller burrows like a corkscrew, inducing and maintaining movement while remaining clog-free. It reduces the need for the continual, expensive maintenance that often arises when traditional pumps are used for this purpose.

Having a low power requirement and steep head/flow characteristics enables Hidrostral pumps to deal with products of varying viscosities, or with changes in system head caused by system resistance. Newtonian, oil-based products such as paint, as well as gas-laden liquids, can be handled by these pumps at much higher viscosities than is possible with conventional centrifugal pumps.

Additionally, Hidrostral pumps are capable of pumping non-Newtonian viscous liquids and have a low shear characteristic to enable delicate products such as crystalline compounds to be pumped without damage. An alternative closed impeller is available for handling live fish, fruit and vegetables.



Hidrostral screw centrifugal impeller

These pumps are offered in a wide variety of materials from cast iron to stainless steel and abrasion resistant ver-

sions. They are available as submersible, closed-coupled or bearing frame constructions, with the heavy-duty process version complying with API 610 standards.

For further information contact: Hidrostral Process Engineering, Unit 2, Kennet House, 77-79 Bath Road, Thatcham, Berkshire, United Kingdom, RG113 3BD.

## MICROFILTERS FOR HIGH TECHNOLOGY APPLICATIONS

The new Hydrofil Absolute filter cartridge from Vokes Ltd. is rated to 0.1  $\mu\text{m}$  and has been developed specifically for the pharmaceutical, fine chemical and microelectronic industries. A 0.2  $\mu\text{m}$  Hydrofil cartridge is also available, fully validated for pharmaceutical applications.

Featuring a naturally hydrophilic nylon membrane, the cartridges combine excellent wetting characteristics with high thermal stability and good chemical compatibility. Typical process industry applications include:

- \* Cold sterilisation.
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- \* The microfiltration of process chemical solutions such as photoresists and development solvents for photography.

Designed specifically for gases and aggressive chemical solutions, the Fluorofil range of microfilter cartridges is claimed to offer one of the highest flow rates available for polytetrafluoroethylene (PTFE) membrane filters. In continuous use, under normal operating conditions, these cartridges have a typical service life of up to 12 months in air or gases up to 85°C, and are capable of withstanding multiple in-line steam sterilisation for up to 170 hours at 142°C. In air or gas applications they have Absolute Particle Ratings of down to 0.02  $\mu\text{m}$ .

Vokes say Fluorofil cartridges are particularly suitable for pharmaceutical and fermentation applications, in steam inlets and vents and for sparging. They are also used in filtration of fine chemicals, including photoresists, developers and solvents.



A hydrofil microfilter pharmaceutically validated at the 0.2  $\mu\text{m}$  TØ 1911/93 microbial rating.

Other Vokes microfilters include Chemifil, based on a polypropylene membrane with microbial ratings down to 0.1  $\mu\text{m}$ , and Biofil, based on Cellulose triacetate membranes and particularly suitable for sterilising aqueous solutions.

For further information contact Vokes Ltd., Henley Park, Guildford Surrey, United Kingdom, GU3 2AP. Tel. +44 483 69971.

## ESTIMATING ENVIRONMENTAL DAMAGE FROM LEAKS

The Windspeed and Direction recording system made by Vector Instruments has been designed to assist in uses such as helping plant management with environmental problems. Should a leak occur in a plant, it can be used to determine which areas have been contaminated by wind-borne materials.



such instances, when measurements of windspeed and wind direction are required for safety purposes at installations handling hazardous material, Vector Instruments has equipment available ranging from basic sensor such as anemometers and windvanes, to complete chart recording systems.

A typical solution is the R800S, an economical recording set which includes an A100 series anemometer and a simplified version of the Porton windvane, together with a single unit containing recorder, interfacing, and multiplexing circuitry.

The robust, single channel strip-chart recorder provides separate non-overlapping wind speed and wind direction traces, and writes on to an inkless, pressure-sensitive paper, resulting in a reliable, low-maintenance system.

Suitable for interfacing to most programmable logic controllers (PLCs), computers and other process control equipment, the A100 series anemometers are available with pulse outputs or analogue outputs for a 12V dc supply or 24V dc with suitable dropping network. They will operate reliably over a wide temperature range, withstanding wind speeds up to 274 km/h.

The W200 windvanes can also be supplied with analogue or digital outputs. Where intrinsic safety is required, both can be used with suitable intrinsically safe IS barriers or isolation devices. (14D689/RS).

For further information contact: Vector Instruments, 115 Marsh Road, Rhyl, Clwyd, Wales, United Kingdom, LL18 2AB. Tel.: +44 745 50700.

## NON-DESTRUCTIVE TESTING OF PREMIUM QUALITY HFI-WELDED STEEL PIPE

Longitudinally welded steel pipe manufactured using the high-frequency

induction (HFI) process has proved itself in the most varied applications. It is mainly used for high pressure pipes in diameters of up to 508 mm (20") for gaseous and liquid media. In recent years, the HFI process has also been increasingly used in the manufacture of large-diameter casing with relatively thin walls (12.6 mm/0.5").

The HFI pipe welding process is a further developed version of the electric resistance welding method. Pipes of this kind up to X70 are suitable for high pressure pipeline applications under extreme service conditions.

The testing methods integrated into the HFI pipe production flow for detecting and eliminating of any imperfections are shown in the figure below.

The non-destructive testing of the HFI-welded pipe is a vital component in modern quality assurance. Non-destructive testing techniques are related to the base material, the longitudinal weld and the pipe ends. Each pipe is

inspected by five different ultrasonic test methods designed to detect lamination-type inclusions in the longitudinal edges of the strip, the strip body and pipe ends in the area affected by the girth weld, and also for the detection of longitudinal defects in the HFI-weld area. This latter test is carried out both immediately behind the weld point to monitor the welding process, and after hydrostatic testing as an acceptance test. During these two ultrasonic tests -- the first one on the endless string and the second on the individual pipe -- a total of eleven probes are employed, which insure that the weld line is thoroughly tested over its entire length.

The non-destructive tests are an important part of the quality assurance system covering the complete manufacturing process. The efficiency of this system is underlined by the fact that more than 1250 km of HFI-welded pipe in diameters between 8" and 20" are successfully produced every year by Mannesmannrohren-Werke AG, Düsseldorf, F.R.G.



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# Cooling Water System in Chemical Industry

Dr. S.K. Sharma\*, Mr. Arun K. Vaish\* & Dr. P.K. Khandelwal\*\*

## Introduction

Term cooling water is applicable whenever the water circulated through process equipments to absorb and carry heat. In industries water once used for cooling gets dirty which is to be cooled down for reuse. During recirculation of this water salt concentration increases which results in deposits in the equipments. The general term applied to such deposits as a result of crystallisation or precipitation of salts from solution is called 'Scaling'. The factors which affect scale formation are temperature, rate of heat transfer, alkalinity, ionic metals, silica, dissolved solids and pH of the solution.

Corrosion is destruction of metal by chemical or electrochemical reaction. However, the rate at which the corrosion takes place is dependent on the resistance to the continued corrosion attack caused by the product of the reaction.

The objective of this review is to reduce corrosion and scale formation by certain inhibitors and application of blow down to control scale formation in cooling water system. Certain techniques for fouling have also been indicated.

## Cooling water system in industry

Industry uses more water for cooling than for any other purpose. Condensers, heat exchangers, engines, compressors all need cooling water. Thus cooling system maintenance can be very expensive unless water is treated to prevent or control corrosion, deposits, biological growth and protect cooling tower wood. Therefore, water treatment in turn is tailored to fit the size and type of particular cooling system. Cooling water systems are broadly divided into two main types; once through and recirculating.

The most commonly encountered deposits in cooling water system are salts of calcium. Carbonates of calcium being least soluble of other calcium salts &  $\text{CaSO}_4$  the lesser (1). Tendency to form scales goes on increasing in once through & recirculating system. The main factor controlling the increased tendency for scale formation in once through & recirculating system is the increased concentration due to cycles concentration. The term cycle of concentration indicates the degree of concentration of the recirculating water as compared with the make up.

A build up of 1" of  $\text{CaCO}_3$  on heat exchanger tubes reduces the rate of heat transfer by as much of 40% (2).

## Corrosion and scale formation

To monitor the scaling a number of standard indices have been designed:

i) Langlier Index (3) measures the tendency of calcium carbonate to precipitate from water under given condition of calcium hardness, alkalinity, pH, temperature and total dissolved solids.

$$LI = \text{pH of water} - \text{pH of saturation of } \text{CaCO}_3$$

A positive index means water has a tendency to deposit scale while a negative index shows a tendency to dissolve scale and corrode. A zero index is balanced but pitting corrosion is possible. The number depends on the concentration of calcium carbonate in each water supply. Reducing the calcium hardness, total alkalinity and pH or a combination of all three will decrease index of water.

ii) Stability index: This was devised by Lyznar and equals twice the pH of saturation of calcium carbonate minus pH of the water. It indicates to what degree, a given water is scale forming under average operating conditions. Scale is expected when this index is under 6. Amount of scaling increases rapidly as the index approaches 4. An index above 6.5 indicates a tendency for the water to corrode (4).

## Monitoring of corrosion scale formation

Chemical treatment keeps scale forming salts of calcium and magnesium in solution by lowering pH of recirculating water with sulphuric acid. Chemical inhibitors are then necessary to prevent corrosion damage. Calcium hardness, alkalinity, pH are related variables in scale control (5).

For a given pH, total alkalinity (ppm) is maximum for a low total calcium hardness (6). It reduces drastically as the calcium hardness increases and then reaches a constant. The variation becomes smooth as the pH decreases.  $\text{CaCO}_3$  equilibrium curve (6) indicates that area below the curve indicates a tendency for  $\text{CaCO}_3$  to dissolve. A given water can be brought under this area by reducing the total alkalinity to a proper value.

The most common method employed to inhibit calcium carbonate scale formation in cooling water system is the use of various antinucleating agents. An antinucleating agent (6) is one which possesses the quality to increase the solubility of salts. This in turn prevents crystal growth which precedes scale formation. The most common inhibitors are polyphosphates, tannins, lignins, starch and combination of these materials. By blending several of the various agents it is possible to secure the additive benefits of each for application to that particular problem.



The solubility of  $\text{CaSO}_4$  is inhibited by the use of dispersants and sequestrants. Dispersants prevent build up of particle size, plus adsorption which involves electrostatic forces. Sequestrants and chelants function through electron transfer forming a water soluble complex with calcium.

To minimise the problems of corrosion and scale formation in process equipments due to cooling water, the water has been treated with the following inhibitor combinations: (7,8,9). a) Sodium chromate, sodium tri polyphosphate and zinc dust, b) sodium hexametaphosphate, borax and zinc dust, c) sodium gluconate and sodium silicate, d) commercial grade inhibitors (10,11). i) Kemwatreat 101 ii) Kemwatreat 301.

The corrosion rate in the stagnant conditions with these inhibitors were found to vary from  $0.4 \times 10^{-3}$  inches per year (IPY) (12) to  $3.8 \times 10^{-3}$  inches per year (IPY). With a view to observe the effect of corrosion at different pH, varying from 7 to 10, Lane indicated that corrosion rate is a minimum of  $1.2 \times 10^{-3}$  inches per year at pH 9 (9).

To observe the role of hardness on corrosion rate, on cooling water system for hardness varying from 30 to 170 ppm at pH 9.3, it is found that there is decrease in corrosion rate from  $6.3 \times 10^{-3}$  IPY with increase in hardness.

The effect of temperature and flow rates as observed in the laboratory model (9,13) (velocity 0.25 to 0.6 m/sec, temperature 53 to 57°C) indicate that after 20 days, sodium silicate & sodium gluconate (30, 30 ppm dose) are the most effective.

Blowdown is the process in which fresh cooling water is added intermittently or to keep the cycles of concentration within safe limits to prevent scale formation. In general the amount of blowdown (5) needed depends on how far the circulating water dissolved solids are allowed to build up by concentration.

Number of concentration 'N' is one way of comparing dissolved solids in the make up with that of the circulating cooling tower water. Since the chlorides remain soluble on concentration, N is conveniently expressed as the ratio of chlorides in circulating water to chlorides in the make up system above.

C = Water circulating in cooling system in lb/hr.

E = Water vapour evaporated from tower in lb/hr.  
B = Water lost by windings, plus that discharged to waste has cooling tower blowdown.

MU = Make up water added to the system in lb/hr.

CLC = Chloride content of circulating water, ppm.

CLMU = Chloride content of make up water, ppm.

$MU = E + B$

$MU(CLMU) = B(CLC)$

$N = \frac{CLC}{CLMU} = \frac{MU}{B}$

$N = (E+B)/B = (E\% + B\%)/B\%$

AND

$B\% = E\%/(N-1)$

A continuous blow down of 2.2 M<sup>3</sup>/hr and 14 M<sup>3</sup>/hr with blended make up would maintain the ideal water quality (5). Besides controlling corrosion and scaling in recirculating cooling water system, the foaming can also be controlled by certain antifoulants. There are certain antiscalants and antifoulant agents commercially available. In a process of the operation, there are certain additive agents available for effective control of bacteria, fungi and algae in industrial recirculating cooling water system. These additive agents operate at interfaces, and play a significant role in control of microorganism. These antiscalants and antifoulants are applicable for cooling water system to number of process industries in addition to industries like paper mill water system, oil well brines, drilling muds, paints, latex emulsions etc.

Some of the commercially available anticorrosion, antiscalants and antifoulants are being reported in the literature. The manufacturers have suggested dose for monitoring scale corrosion and fouling.

Table 1 reports (14) some of the commercially available anticorrosion agents, antiscalants and antifoulants with their chemical nature.

#### Acknowledgements

The authors express their thanks to director and Professor V. Panduranga Rao (Dean, Practice School Division) of Birla Institute of Technology and Science, Pilani (Rajasthan) and Shri I.H. Parikh (President), Dr. Lalit Gupta (Executive President) of Grasim Industries Limited, Nagda (M.P.) for providing necessary facilities.

TABLE 1

| Commercial Name | Chemical Nature                                                                                                                                                          |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Aquat 560    | It is based on organophosphate and contains no chromate. It is compatible with most chemicals in water treatment like chromate, zinc polyphosphate, organophosphate etc. |
| 2. Aquat 540    |                                                                                                                                                                          |



## Commercial Name

## Chemical Nature

|                                    |                                                                                                                                                            |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Kemwatreat - 101                   | It is a bimetallic glassy polyphosphate of zinc and is free from toxic chromate.                                                                           |
| Ulas corrosion and scale inhibitor | It contains buffering agents to control the pH of water and corrosion inhibition is conferred by the well known Benzoate-Nitrite Anodic Inhibition System. |
| -12.                               | It is a blend of an organic dispersant, a polyphosphate and an antifoam agent.                                                                             |
| Aswasof P-120                      | It contains a low molecular weight polyanionic compound and contains no phosphate, organic or inorganic.                                                   |
| Aquadesttle -4050                  | It contains a penetrating agent to facilitate the infiltration of the cytoplasmic membrane by the active biocide.                                          |
| Aquat - 311                        | It complexes with ferric ions causing immediate death of cell.                                                                                             |
| Aquat - 321                        | It contains inorganic and organic compounds blended to given synergetic effect for control of microbiological foulings.                                    |
| Kemwatreat - 301                   | At boiler temperature in the presence of alkali, it decomposes into trisodium phosphate to precipitate calcium hardners.                                   |
| Aswasof P-170                      | Alkaline & nonhygroscopic.                                                                                                                                 |
| Aswasof P-42                       | It is an inhibited acidic composition.                                                                                                                     |
| Scalgun - WS                       | Organophosphate                                                                                                                                            |
| Corobit - EPA - 529                | Hyproscopia                                                                                                                                                |
| Aswasof P-22                       |                                                                                                                                                            |

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## Science Briefs

### MORPHOUS SILICA FROM RICE HUSK

A process developed at the Indian Institute of Technology in New Delhi will enable rice mills to use their waste rice husk for generating power and producing a myriad of industrial products.

In the new process, rice husk is burned in special conditions to produce gases which are used to run a power generator. The reaction leaves behind ash rich in amorphous silica, a substance used widely in the rubber industry. Raw materials for the paint and insecticide industry are other byproducts of the reaction.

"This is an integrated use of an agricultural waste for value added products," said Dr. P.D. Grover, professor in the IIT department of chemical engineering.

The studies have shown that a plant which takes in 250 kilograms of rice husk per hour could churn out 122 kw of power. If part of this power is used to run the rice mill itself, the IIT scientists have estimated, that there would still be 65 kw of surplus power that could support a few houses in the vicinity.

The IIT has patented the process technology and a pilot plant based on the new process was set up in the Philippines under a UNIDO programme last year.

A site has been selected for a demonstration cum commercial plant to be set up near New Delhi. In the new process, rice husk is burned in the absence of air at about 350 degrees celsius to release a mixture of inflammable gases: hydrogen, carbon monoxide and methane, inflammable gases called pyrogases. These gases are driven into a dual fuel power generator that uses both diesel and the gases as fuel. The waste ash that is left behind as a residue contains

nearly 95 per cent amorphous silica. The studies have shown that a plant using 250 kilograms of rice husk per hour can yield about 50 kilograms of amorphous silica per hour.

Tar, another byproduct of the reaction, can be further processed to get black paints and the basic raw materials for germicides. Liquid residues produced in the reaction contain a substance called pyroligneous acid, a substance used in wood seasoning and in termite control.

-- P.T.I. Science Service

### PLASTIC TARPAULINS

A Bombay-based manufacturer has produced for the first time in India tarpaulins from cross-laminated plastic films -- a revolutionary concept in the manufacture of plastic films. This technology is available with only nine other manufacturers in the world.

The new tarpaulins weigh only one-seventh the weight of conventional cotton canvas tarpaulins of the same size while enjoying a high strength to weight ratio. A combination of high tensile strength coupled with high elongation makes these tarpaulins very flexible. They are thus ideal for covering odd shaped articles. And because they are virtually puncture proof, they can be used to cover blunt or sharp edged solid objects without any damage.

They have an excellent moisture barring property. As all joints are heat sealed, there is no leakage or seepage. The material is not affected by ordinary or salty water and is inert to most chemicals, acids and acid fumes. They have been treated to resist microbial and fungal attacks as well as stabilised against ultraviolet rays in the sunlight to ensure their long life in spite of exposure to the sun, rain or wind. While conventional tarpaulins are available only in drab and dirty looking colours, these

new tarpaulins which are very economic are available in an attractive range of colours. They are best suited for covering machinery, raw material, packing material, finished products, cartons and any material in transit. They can also be used to cover sheds, camping tents and as floor underlays.

-- P.T.I. Science Service

### MIRABILIS -- A POTENTIAL SOURCE OF METHANE

Mirabilis, better known as the four-o'clock plant whose flowers close daily in the evening, is emerging as a potential source of methane, which could substitute for cattle dung traditionally used in biogas generators. The quick-growing shrub, is abundantly found in the hotter valleys of the north-west Himalayas upto 2000 metres, and in the far east in Bengal and Manipur. It can also grow rapidly in summer in dry and sandy areas, as well as in shallow lakes and ponds, and sewage water.

Searching for agricultural and forest residues that could serve as alternate sources of energy in the rural areas, scientists at the Alternate Hydro Energy Centre, Roorkee University, tried to assess whether Mirabilis jalapa could substitute for cattle dung in biogas generators.

During extensive trials, they digested anaerobically slurries of dried Mirabilis leaves, cattle dung and effluents in separate digesters for two months, at a constant temperature of 36 degrees Celsius. They analysed samples taken at periodic intervals for volume of biogas, total volatile fatty acids, volatile matter, ash and carbon. The rate of gas production was higher in the case of Mirabilis leaves, almost double that of cattle dung, the scientists, S.K. Sharma, J.S. Saini, I.M. Mishra and M.P. Sharma, said reporting their findings in the journal "Biomass". Mirabilis leaves produced about 400 litres of gas per kilogram



of dry matter, while cattle dung produced about 200 litres per kg of dry matter. The volume of gas from the digester with *Mirabilis* leaves also had a higher methane content, almost 70 per cent, compared to 62 per cent methane in the gas produced by cattle dung.

The reduction of volatile matter in *Mirabilis* leaves is 1.85 times higher than in the case of cattle dung, the Roorkee researchers noted. The total reduction of volatile matter in *Mirabilis* leaves was 42.6% and 22.9% in the case of cattle dung. The results indicate that *Mirabilis* may play a significant role in substituting cattle dung, offering a low-cost and simple alternative appropriate for local conditions.

-- P.T.I. Science Service

## CYANIDE CONVERSION INTO CARBON DIOXIDE AND NITROGEN

A chemical and biological wastewater treatment process in which cyanide is completely converted into carbon dioxide and inorganic nitrogen is being commercialised by a US company as an alternative to conventional alkaline chlorination or treatment by peroxide or by sulphur dioxide and air.

The new process called the CNC process does not generate cyanates which are potentially toxic materials or oxidise other wastewater constituents as do many other methods, the journal "Chemical Engineering" said, quoting the company Radian Corp. based in Austin, Texas.

In comparison with alkaline chlorination, reagent costs for the process are about 50 to 80 per cent lower and no chlorine gas is required, thus simplifying handling requirements and reducing safety concerns, the journal said.

The CNC process mixes wastewater with a proprietary, aqueous based non-toxic reagent in a chemical reactor, then passes the effluent through a biological

oxidation process, where it is treated, clarified and discharged. The route can reduce cyanide concentrations from 30-80,000 parts per million to less than 0.5 parts per million, according to the journal.

## HL'S BREAKTHROUGH IN TISSUE CULTURE

The Hindustan Lever (HL) Limited, a multinational, has reportedly achieved a breakthrough in tissue culture technology. Encouraged by this feat, it is now going in for application of the technology by producing tissue culture plantlets material in three locations to start with Andhra Pradesh, Maharashtra and U.P. The total project cost is Rs. 5 crores.

The plant will manufacture tissue culture plantlets of cardamom, coconut, sugarcane, banana, citrus, dates, palm, strawberries, horticulture/ornamental plants as also potato microtubers and such other crops which may become amenable to tissue culture for a capacity of 100 million plantlets and 25,000 tonnes of microtubers and other since ex-tissue culture. The project cost will be through internal accruals Rs. 450 lakhs and foreign exchange loan of Rs. 50 lakhs.

While seeking government's approval (which has since been granted) the company told the Centre, tissue culture technology was proposed to be introduced for the first time in the country and would, therefore, require immense efforts in terms of extension work and application development.

While the manufacturing activities will be carried out in Rangareddy district of Andhra Pradesh, Raigad district of Maharashtra and Agra in Uttar Pradesh, the company would also be setting up nurseries at different places all over the country wherever planting material would eventually be kept for three to six months before its actual application in the agricultural fields.

The company has also clarified to the government that this should not be a commodity specific as in the case of hybrid seeds. Clearing the proposal, the government told the company the commercial exploitation of varieties composition/hybrids and tissue culture materials will all be subject to the regular testing under ICAR evaluation network as applicable to other indigenously developed materials.

The company shall not commercialise the items to be developed unless such varieties were approved and notified by the central seeds committee. It has also been notified that it shall not enter into foreign collaboration for implementing the project.

## ELECTRONIC DEVICES FROM BIOCHEMICALS: PLAN DRAWN UP

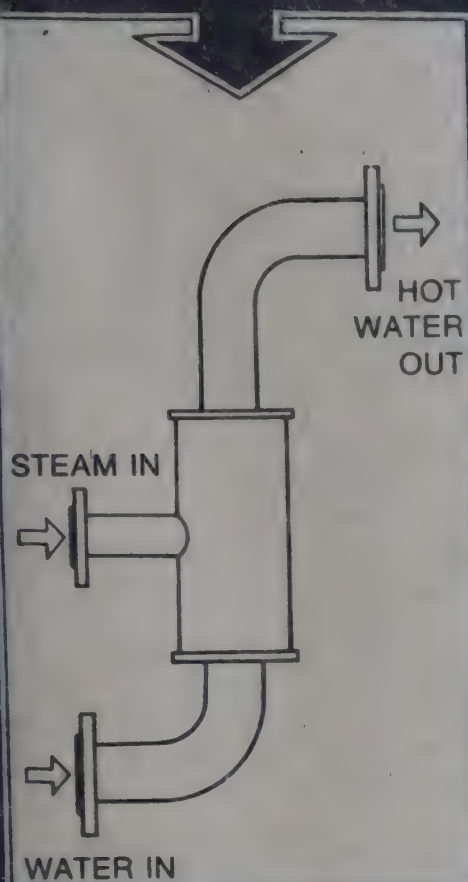
Indian scientists have framed guidelines for a national programme on molecular electronics that will aim at the indigenous fabrication of novel electronic devices from biomolecules.

The Tata Institute of Fundamental Research in Bombay, the Indian Association for the Cultivation of Sciences in Calcutta and the National Physical Laboratory at N. Delhi are expected to participate in the programme. Scientists attending a national workshop on molecular electronics said the programme will focus on the development of biosensors and electronic devices based on biological molecules.

Biosensors are highly sensitive devices used for the detection of a range of chemical or biological substances. The programme envisages the development of biosensors to detect glucose levels and determine pollution levels in water. Participants at the workshop included NPL director, Dr. S.K. Joshi, professor of Chemical Physics at TIFR, Dr. G. Goyal and about 20 researchers from various laboratories intending to join the research programme.



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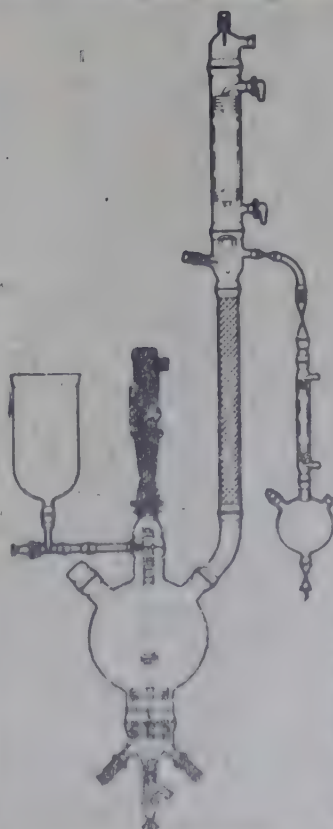
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# NEWS FROM ABROAD

## HUNGARY PLANS SELL-OFF, SEEKS FOREIGN HELP

Hungary is putting 53 state-owned firms up for sale and is seeking investment and technology from foreign firms. The state sell-off represents about one-fifth of Hungary's industrial output including chemicals and drugs firms and the search for investment may include a Can\$500m (\$420m) offer from Canada's Nova Corp.

Foreign trade minister, Tamas Beck, has been touring Western Europe offering a prospectus of 53 firms including Borsodi Vegyi Kombinát (BVK), the chemicals manufacturer, and drugs outfit Chinoin Chemical and Pharmaceutical Works. Hungary is desperate to acquire Western capital because plans to restructure the economy are not progressing too well. Moreover, the state faces massive debt repayments in the period 1990-93.

BVK is a major chemicals producer manufacturing PVC (190,000 ton/year), VCM (190,000 ton/year), ammonia (230,000 ton/year), urea (100,000 ton/year), ammonium nitrate (300,000 ton/year), pharmaceutical intermediates, and phosgenations. Moreover, the company intends to bring on-stream a 25,000 ton/year MDI unit at Borsod in the near future. This project was funded by the World Bank.

The company currently boasts sales topping Forint15bn (\$242m) with profits of Forint2bn. BVK is looking for international cooperation in phosgene processing. It produces 15,000 ton/year phosge-

ne but only consumes 3,000 ton/year captively, it is considering construction of a polycarbonates facility in the longer term.

Other projects under consideration include a 10,000 ton/year TDI plant and a facility to make isocyanates for plant protection chemicals. Sources in the firm have revealed the company would like to process TDI to produce polyurethanes and that it is seeking partners.

Chinoin Chemical and Pharmaceutical Works has also been earmarked by the Hungarian government for sale. The Budapest-based firm is Hungary's second largest drugs outfit after Gedeon Richter with a sales output of about Forint10bn but is the country's largest exporter of drugs to hard currency regions with exports of \$52.3m.

Meanwhile, Istvan Kortvelyes, Hungary's deputy minister responsible for chemicals headed up a high powered trade delegation to Canada. The team took part in discussions with officials from Nova Corp and the ICI subsidiary C-I-L. Sources in Hungary have suggested Nova is willing to commit Can\$500m (\$420m).

Nova president James Butler confirmed that his company had a visit from the Hungarians but added the level of investment had not been decided. "We do have a team in Hungary evaluating potential projects but no investment commitments have been made," he added.

Nevertheless he expressed his enthusiasm to work with the Hungarians as Nova is interested in establishing an East European base. But Nova would only get

involved, he cautioned, if it was in line with the company's strategy, fitted in with its long term objectives and would be profitable to both parties.

Kortvelyes' team also met up with officials at C-I-L. The Hungarians were interested in looking at C-I-L's 400,000 ton/year ammonia facility at Courtright, Ontario. This plant uses ICI's AMV process and was started up in 1985.

"The Hungarians have very old plants and are looking at ways to improve efficiency. In the short term their interest is in retrofitting the existing facilities but in the longer term they may build a fertilizer complex," explained Harry van Praag, ammonia manager at C-I-L's agricultural chemicals division.

## BOOTS & HOECHST CELANESE TIE UP

Boots, the UK pharmaceuticals concern, and Hoechst Celanese have finally tied the knot and set up a joint venture company to market and manufacture bulk ibuprofen in the US. Talks about the 50/50 joint venture were first made public over a year ago.

BHC Company has already set up its headquarters in Dallas, Texas. Design and engineering work has begun on a new \$35m 2,500 ton/year production facility due to come on stream in 1991.

BHC is scheduled to start marketing the analgesic ibuprofen in the US in two months' time — initial supplies will come from Boots 3,000 ton production facility in Nottingham, UK.

The new Texas-based plant will use a process developed by Celanese. It still uses isobutyl benzene as the starting material but re-



quires only three production steps. Pilot plant results indicated that all intermediates are produced in high yields and require little purification. Boots has no plans to switch to the technology at its UK plant.

JS Alder of Hoechst Celanese advanced technology group has been appointed BHC president, with GJ Eisenhauer of Boots Pharmaceuticals vice president, marketing.

### **MANNHEIM JAPAN MERGES WITH TOHO**

In an unprecedented move, Boehringer Mannheim Japan and Toho Pharmaceutical Industries, Osaka, have announced a merger of their companies. This is the first time an international health care company and a Japanese pharmaceutical company have agreed to a 100 per cent capital participation and merger. The merger will be effective from 1 January 1990, and the resulting company will be named Boehringer Mannheim Toho.

In connection with the transfer of all its shares to Boehringer Mannheim Japan, Toho has changed its name to Boehringer Mannheim Toho. It has projected sales in 1989 of Yen11bn (\$78m). Boehringer Mannheim Japan expects the group's total domestic sales will reach Yen20bn in 1989. It hopes to acquire a 0.5 per cent share of the Japanese pharmaceutical market within 10 years.

Toho specializes in the production and marketing of branded generic pharmaceuticals. Its main products are used for the treatment of metabolic diseases and cardiovascular disorders. Sales for Toho in the year ended 31st March 1989 were Yen8.6bn.

### **HENKEL ACQUIRES GREEK STAKE**

West Germany's Henkel has exercised its option to buy 75 per cent of its Greek licensee, A & N Zachariadis.

The Athens-based firm has produced and marketed Henkel's textile auxiliaries, industrial cleaning agents and adhesives since 1980. Its turnover totals DM8m/year.

Henkel announced that the acquisition will enable it to expand its business in Greece. A&N Zachariadis, to be renamed Henkel Chimika, will operate alongside the company's other Greek affiliate, Henkel Hellas, which has responsibility for consumer products.

### **R&H LINKS WITH ORKEM**

Rohm & Haas has announced a joint venture with Orkem to manufacture and market polyacrylate water-soluble polymers. The new company, Norschaas, is expected to be a major supplier in the market, selling the polymers throughout Europe and the Middle East.

A manufacturing facility for Norschaas is already under construction in Villiers-Saint-Paul in France. The new plant, representing an initial investment of over \$10m, will have a production capacity in excess of 40,000 ton/year.

Orkem, through its chemical arm Norsolor, is to provide key raw materials from its monomers operations in France.

### **SANDOZ BOOSTS SEEDS BUSINESS WITH SWEDISH BUY**

Sandoz has agreed to take over the Swedish seed and plant genetics company, Hillehog, from Provend, a Volvo subsidiary. Hillehog is a leading company in the field of sugar beet seeds and

is seen as a major force in European plant biotechnology. In 1988, it reported a pretax profit of Skr108m (\$16.3m) on a turnover of Skr624m.

The acquisition will consolidate Sandoz position as the world's second largest seeds company. Turnover for Sandoz' seed businesses reached SF595m (\$89.7m) in 1988. Although this is Sandoz' smallest division, accounting for only around 7 per cent of its total turnover, it has been strengthened with the acquisitions in 1987 of the US company Stauffer Seeds and some small UK and Spanish seeds firms. Sandoz seeds strong potential for growth in this area, said a company spokesman, and Hillehog's plant genetics research division is of particular interest.

Hillehog was absorbed into Provend, Volvo's food arm, in 1985 when Volvo acquired its original parent company, AB Cardo. Provend also has another seeds company, Weibulls, which is unlikely to be sold off as it is strongly concentrated in Sweden.

Before Hillehog was purchased by Volvo, ICI had agreed to acquire the company for a reported £80m, but the deal fell through when it was unable to secure majority control. ICI was reportedly approached this time when the decision was made to sell Hillehog, but was not interested because of antitrust problems relating to its recent purchase of the Belgian seeds company, Societe Europeenne de Semences.

The sale will include Hillehog's 15 per cent holding in the US research company Advanced Genetic Sciences Inc. and its 10 per cent stake in Belgium's Plant Genetic Systems SA. Terms of the deal have not been disclosed but industry analysts suggest a



possible price would be approximately Skr1.5bn. The sale is still subject to agreement by the Swedish government.

## PP FACES ANTITRUST REVIEW

The UK Monopolies and Mergers Commission (MMC) has started an investigation into the implications of Monsanto's proposed sale of its bulk analgesics business to Rhone-Poulenc. If the sale were to go ahead, Rhone-Poulenc would control an estimated 80 per cent of the UK market, said to be worth £5m/year (\$7.7m).

At present, Rhone-Poulenc accounts for around 20 per cent of the UK market for bulk painkillers. However, none of these are produced at sites in the UK. The acquisition would give control of Monsanto's production plant in Ruabon, north Wales, to Rhone-Poulenc. This plant, which produces salicylic acid, methyl salicylate and powdered aspirin, supplies all of Monsanto's 60 per cent market share in the UK.

The chairman of Rhone-Poulenc Ltd., Dr. Keith Humphries, said, "While we can understand the reasons for the deal to be further investigated, we are naturally disappointed. We are confident that our judgement, that it is in the best interest of both the customers and the employees involved, will be borne out by the MMC inquiries."

The proposed sale also includes Monsanto's production units in the US, located at St Louis, Missouri, and Luling, Louisiana, and its share in a joint venture for the manufacture of acetyl salicylic acid with Osothsapha, near Bangkok in Thailand. The US federal trade commission was "unable to

confirm or deny" that it was investigating the implications of the agreed sale in the US. The European Commission in Brussels is also rumoured to be looking into the effects of the proposed deal.

## AQUATEC MOVES INTO US MARKET

Brazilian water treatment chemical company Aquatec is making a \$17m push into the US market.

Its new US arm, Aquatec Chemicals International (ACI), has been financed by a loan from the Chase Manhattan Bank. Chase Manhattan Investment Holdings has also taken an undisclosed stake in the business.

Part of the \$17m has already been spent on acquiring two US companies, Water Science and Burmah Technical Services, the latter a subsidiary of Burmah Oil.

According to Aquatec chairman Enio Resende, the expansion is part of an internationalization strategy which includes the completion of a new plant in Portugal later this year.

In Brazil the \$67m/year turnover company runs a unit in Sao Miguel Paulista and research and development facilities in Cotia.

It is also planning to set up a new \$24m plant in Bahia state to produce 20,000 ton/year of feedstock.

## UNILEVER UPS COLOUR COSMETICS

Unilever is to considerably improve its ranking in the European colour cosmetics market with its agreement to acquire Schering-Plough's UK and West German cosmetic companies.

It will purchase Rimmel International and Chicago GmbH for around £78m (\$120), lifting it to second place behind L'Oreal in the European market.

London-based Rimmel, has a turnover of around \$45m/year. It claims to be the UK market leader in unit volume terms and is third behind Boots and Avon in sales value.

Unilever values the UK colour cosmetic market at around £230m at manufacturers' prices, and the total European market at £950m.

In West Germany, Chicago's two brand names hold fourth and fifth place in the West German market. Chicago reported sales of around \$30m in 1988.

The acquisition will enable Unilever to achieve, "the critical mass necessary to provide the strong base from which new markets can be built," said Michael Perry, director responsible for personal products operations.

## HYDRO STALKS SECURUS

Norsk Hydro has acquired a majority shareholding in the Norwegian plastics specialist, Securus Industrier AS, and will make a bid for the balance from the remaining shareholders. Securus, which reported total sales of Nkr1.2bn (\$167m) in 1988, has two subsidiaries, Protan A/S and Teknisk Isolierung A/S. Their business activities focus on biopolymers, plastics/construction and technical insulation.

Norsk Hydro sees potential for growth particularly in the biopolymers and plastics/construction sectors, where Hydro can contribute its research capacity, financial resources and international network.

Hydro has held a 35.6 per cent share in the company for several years, and increased it to a 52 per cent holding with the purchase of shares from Den norske Creditbank for Nkr140/share.



## Chemical Markets Abroad

### Q3 METHANOL CONTRACTS REFLECT MARKET SLUMP

Methanol contracts for Q3 were concluded against a background of rapidly decreasing spot prices. The first settlement between UR-BK (ex-UK Wessling) and Degussa reached DM251-256/ton fob NWE, marking a drop of DM64-69/ton on the last quarter. Other majors appear to have finalized contracts at DM251-256/ton fob NWE, which is now the accepted quarter three contract.

All players say the settlement reflects recent changes in world market conditions. Spot prices which began quarter two at \$310-315/ton fob for T2 material have now fallen to \$245-250/ton fob, mirroring movements in contracts. Oversupply seems to be the key to both contract and spot prices.

Observers have expressed surprise that quarter three contracts were concluded so swiftly. It was believed that buyers would resist an early settlement and wait until spot prices dropped further to enhance their negotiating position.

The slump in methanol prices is being blamed on various factors, depending on where one is in the market. US producers have de-mothballed three plants since the beginning of the year. Ashland Chemical has re-started a 580,000 ton/year Allemania complex. Terneco's 280,000 ton/year Pasedena unit has also been brought back on stream, after being closed in 1986. While Quantum Chemicals, a subsidiary of USI has de-mothballed a 180,000 ton/year plant at Deer Park, Texas.

From a position of tight supply, for the majority of 1988, the US methanol market is now relatively long. Changes in contract prices

ape this movement. In June contract prices stood at 49-50 cents/gallon, while July settlements have been agreed at 45-46 cents/gallon. Spot prices are now being quoted at 41 cents/gallon, with strong expectations towards lower numbers.

Quantities of exotic product have been arriving in Europe at regular intervals further undermining European prices. Libya, New Zealand, Canada, Malaysia, and Trinidad have sent material towards the region. Although contracts account for a fair share of the imported material, plenty still finds its way into the merchant market.

Chile's 750,000 ton/year Cape Horn plant, the biggest in the world, is now working to full capacity. Most of the Chilean plant, is spoken for in contract. But the psychological effect of 750,000 ton/year more product in the market, has dampened price expectations and lessened spot requirements.

### BP COMMISSIONS ACETYL PLANT

BP Chemicals has commissioned its 175,000 ton/year A5 acetyls complex at Hull, Humberside, UK. This will bring BP's acetic acid/anhydride production capacity at Hull to around 600,000 ton/year when it is at full capacity. Currently the economics of the acetyls project is based on methanol prices of \$140-150/ton, but it must be noted that methanol is purchased wherever it is cheapest.

An additional 270,000 ton/year is available from the Sterling Chemicals Texas City plant, leased by BP Chemicals and recently de-bottlenecked to the tune of 45,000 ton/year.

The additional capacity gives BP around a 20 per cent market share of the total world acetic acid market which stands at around 4.5m ton/year and growing at 2-3 per cent/year. A large proportion of its production goes to the Far East. BP recently signed a contract to supply acetic acid to the Korean concern Sunkyoung Chemicals' 260,000 ton/year polyester intermediates plant.

BP is currently conducting a feasibility study with Samsung for the construction of a 150,000 ton/year acetic acid plant at Ulsan, Korea. According to BP Chemicals ceo, Ray Knowland, the study is expected to be completed and a decision made in the next two-three months.

John Hooper, chief executive, BP Chemicals' acetyls and solvents division, now sees BP as a "good number two" to Hoechst Celanese in the world market. Hoechst Celanese has recently completed the rebuilding of its 250,000 ton/year acetic acid facility at Pampa, Texas, US.

### TONEX UPS PLANT

Tonex Co, a joint venture between Exxon and Tonen Sekyukagaku (TSK), has completed the construction of a 7,000 ton/year speciality white water resins plant, in Kawasaki, Japan. The unit will use Exxon's proprietary technology.

Japanese demand for white water resins has grown by over 30 per cent/year in the last five years, and should continue at 15-20 per cent/year into the 1990s, says Tonex.

Tonex hopes to meet growing demand from local customers, not only in Japan but throughout the Asia Pacific region. White water resins are used in hot-melt adhesive applications, baby diapers and high quality bonding agents.



## Biotechnology

### PASTEUR, MERIEUX MERGE IMMUNUM, VACCINES ACTIVITIES

Institut Pasteur and Institut Merieux are merging their serum and vaccine activities in a deal which will give them a combined 30 per cent of world markets. However, both groups' domestic activities in the French market will remain untouched by the merger.

The new company, Pasteur-Merieux Serums et Vaccins, will be wholly owned by Institut Merieux. It will consist of the existing Institut Pasteur venture company—Pasteur-Merieux Vaccins, in which Merieux already holds a controlling 51 per cent stake—and of Merieux's human health divisions.

In exchange, Institut Pasteur will be given an undisclosed stake in the Merieux holding company and a seat on the board. Existing research agreements between the two parties have been extended to 31 December 1998.

These provide for access to Institut Pasteur's immunology research and for cooperation on the development of Pasteur Foundation discoveries.

Institut Pasteur will also receive royalty payments on the new company's sales, with a guaranteed minimum of FF14m.

Jeanne-Marie Lecomte, president and general manager of Pasteur-Merieux Vaccins, explained that costs of sales and of research had made the merger necessary. "We are lifting from childhood to manhood to become the first world vaccine producers," she said.

Pasteur-Merieux Serums et Vaccins will have combined sales of FF1.8bn and 2,800 employees. It will immediately have about 18 per cent of the world vaccine market. But if the proposed merger of Merieux with Canadian-based Connaught goes through, this figure will be boosted to 30 per cent overnight.

### WEST GERMANS BID TO CUT DRUG DELAYS

The West German government has amended its pharmaceutical law in a bid to cut delays in drug registration.

The aim is to cut the backlog—the federal health authority, the Bundesgesundheitsamt (BGA) is up to two years behind in approving applications. It is also intended to speed up the registration process. According to the pharmaceutical industry, it can take up to 30 months for new products to be registered rather than the four months the law allows.

As a first step towards easing the burden on the BGA, manufacturers of homeopathic drugs will no longer be required to prove their effectiveness as a prerequisite for registration.

To speed up registration, external experts not on the BGA payroll will be authorized to review applications for the registration of new drugs. Of particular significance to international firms, drugs registered in other EC countries will be exempt from re-registration in West Germany.

Other provisions in the amended act relate to the registration

of drugs on the market before 1978. Manufacturers will be able to reformulate products in the light of current knowledge about their safety or effectiveness without further testing.

Finally, authorities will be empowered to prohibit exports of controversial drugs to developing countries in particular, unless the exporter can prove that that drug is essential to the importing country.

### NEW GENETICS LAW

Laws regulating biotechnology research and production are due to be passed by the West German cabinet shortly.

The genetic engineering framework law was originally due to be adopted last autumn but had to be redrafted after publication of the new EC directive regulating the use of genetically manipulated microorganisms in closed systems.

Under the proposed law, applications for plants and research facilities relating to organisms and materials not considered to be exceptionally hazardous will not in future have to go to a public hearing. This is in contrast to existing regulations. Public hearings will still be mandatory for hazardous materials and known pathogens. The federal health authority and its central commission on biological safety will retain responsibility for approving genetic research projects. But federal states will be responsible for approving industrial projects.

The health authority will rate projects according to hazards to health and the environment.



## Environment

### DU PONT MOVES AHEAD ON HCFC'S

US Chemicals giant Du Pont is to build a \$20m plant in Canada for the large-scale production of a potential replacement for the ozone depleting gas CFC-11.

The Ontario plant, due to come on stream in 1990, will be the company's second commercial scale facility for HCFC-123 production and a key part of its strategy to phase out CFC production by the year 2000.

HCFC-123 is a leading candidate to replace CFC-11 in industrial refrigeration equipment, insulation and cushioning foam — a market worth about \$500m/year in North America alone. It also has potential to replace CFC-123 as a cleaning agent for printed circuit boards.

Du Pont will not disclose the Canadian plant's projected capacity, but expects it to meet the needs of the North American refrigeration industry.

The company is a member of a consortium of producers combining resources to conduct toxicity tests on HCFC-123. Preliminary results have now been completed and, "we are optimistic that they are going to be within acceptable limits," said a Du Pont spokesperson. Final results are not expected until 1991-92.

Du Pont has spent some \$70m on alternative research and development since the mid-1970s and committed another \$45m for 1989.

But investments of over \$1bn for the next 10 years will be needed to completely restructure its CFC business for alternative products, the company estimates.

### DSM FINED FOR ILLEGAL WASTE DUMPING

Dutch chemicals company DSM has been fined Dfl. 25,000 (\$13,200) for the illegal dumping of chemical waste. It has been ordered to pay the Dutch government another Dfl. 500,000 to compensate for profits made from the illegal disposal.

A court in Maastricht ruled that DSM deliberately dumped 5,500 ton of melamine sludge in a pit near Geleen, its main production site, in 1983. The company did not have dispensation to do so under the Chemical Waste Act.

DSM still faces other charges of environmental destruction. The court is now to investigate charges that DSM illegally dumped waste in a pond in Urmond, near Geleen.

### AVR TO BUILD NEW ROTARY KILN

Afvalverwerking Rijnmond Chemie (AVR) is to build a new Dfl. 90m (\$40.8m) rotary kiln which it claims will put an end to current undercapacity for chlorinated hydrocarbon incineration in the Netherlands.

The new kiln, due for completion mid-1991, will have a capacity of 50,000 ton/year, taking AVR's total capacity up to 205,000 ton/year. It will be capable of burning chlorinated hydrocarbons at 1,000°C to 1,200°C — a facility only AVR and rival Akzo can currently offer in the Netherlands.

According to AVR, the kiln's three tier exhaust treatment unit will enable it to take waste with a higher sulphur content than its existing two kilns.

### PLAYERS DISAGREE ON Q3 SETTLEMENTS

Third quarter contracts continue to be settled. Recently a toluene contract plus a number of ethylene and styrene contracts have been concluded. However, many players are reluctant to accept agreements on the market price.

For ethylene, an ex-works figure of DM1,100/ton was agreed between a major German producer and a Netherlands customer. It has been estimated that a first delivered number could come to DM1,120-1,150/ton FD. So observers pointedly note, that some contract agreements where transportation costs are paid, are shared.

It could be argued that a first delivered contract of DM1,100/ton exists. A number of buyers have shown reluctance to settle at the DM1,100/ton ex-works and continue to negotiate for lower numbers.

Between market leaders, styrene contracts have been settled at DM1,660/ton. The settlement presents a drop of DM400/ton from the last quarter.

Players feel the dip reflects a changing market environment throughout quarter two.

Where spot prices have fallen by \$200/ton for T1 product, observers feel buyers may have waited before settling, thus maximizing falling spot price arguments in negotiation deliberations.

The first nitration grade toluene contract has been settled by a Netherlands producer at \$225/ton, representing a fall of \$75/ton from the last contract. The present agreement is for the first half of quarter three, when it will be reviewed.



# News About New Projects

## TH KOREA OFFERS AID BANDAR KHOMEINI

South Korea may help the Iranians complete the petrochemical complex at Bandar Khomeini. The fate of the complex has been in some doubt since executives from Mitsui signalled their intention to pull out of the project.

The Japanese partners, headed by Mitsui, claimed that most of the 13 major plants have been damaged by the Iran-Iraq war, a claim refuted by Iran's state-owned National Petrochemical.

The plant was 85 per cent completed with both sets of partners investing a total of Yen600bn (US\$3bn). Ahmed Bahgozar, chairman of National Petrochemical, claims the war damage is very slight and is determined to complete the 18 years project.

It is believed Iran has been sounding out a number of firms to assist in completion of the project, including some West German concerns. Jung Hyunkwak, head of South Korea's association of machinery industry, is now offering to help complete the project. There are no details to the content of the offer.

Originally, the project was a 50:50 joint venture involving National Petrochemical and a Japanese consortium including five Mitsui group companies, 20 Japanese commercial banks and 27 major contractors. Construction of the complex was halted in 1980 when the Iran-Iraq war broke out.

## Capacity of plants at proposed Bandar Khomeini complex (ton/year)

|               |           |
|---------------|-----------|
| Ethylene      | 300 000   |
| Propylene     | 112 000   |
| Butadiene     | 25 000    |
| LPG           | 1,900 000 |
| Caustic soda  | 269 000   |
| EDC           | 294 000   |
| VCM           | 150 000   |
| ldPE          | 100 000   |
| hdPE          | 60 000    |
| PP            | 50 000    |
| SBR           | 40 000    |
| Benzene       | 351 000   |
| Mixed xylenes | 144 000   |

Source : Mitsui

## FIRMS PLAN THAI LAB PLANT

An Alliance of Japanese, American and Dutch companies are planning to set up a new linear alkylbenzene (LAB) venture in Thailand. An announcement is expected shortly.

The joint venture company, expected to get the go-ahead from Thailand's board of investment in the next few days, is to build a Baht900m (\$35m) LAB plant for start-up in 1992.

According to Japanese sources, the company will be 20 per cent owned by local firms, 7 per cent by Mitsubishi Corp, 20 per cent by Mitsubishi Co (Thailand), 5 per cent by Mitsubishi Petrochemical, 16 per cent by Lion Corp (Thailand), 16 per cent by the US Colgate group and 16 per cent by the Anglo-Dutch group Unilever. It will be capitalized at around Baht280m.

Unilever confirmed that it is in discussions about a LAB joint venture. Any contracts drawn up will be signed within the very

near future, the company said. The LAB plant will have a capacity of 40,000 ton/year, more than sufficient to supply the Thai market with the 23,000 ton/year of LAB it uses as a raw material for detergent. At the moment Thailand relies exclusively on imports for LAB supplies.

The joint venture will initially import LAB raw materials, n-paraffin and benzene, but the Thai government is committed to building a new petrochemical plant as part of its petrochemical project.

## BAYER UNVEILS MDI EXPANSION

The Bayer group has announced two major expansions for polyurethane and elastomer starting materials.

In Japan, the 50:50 joint venture with Sumitomo Chemical, Sumitomo Bayer Urethane, is already building a 30,000 ton/year MDI facility at Niihama.

Along with a recently completed increase in output of an existing MDI plant at the site, capacities for the PU intermediate will rise to 67,000 ton/year. At the same time, Sumitomo will raise aniline output to guarantee feedstock supply for the new facility.

Bayer points to "strong growth" in demand for MDI in Japan, but also in other Far East markets.

In Europe, the West German group is expanding capacity at the Tarragona, Spain site, where it is adding some 50,000 ton/year to the present 12,000 ton/year capacity.

Bayer's US subsidiary, Mobay Corp, plans to double output at its Baytown, Texas, works for hexamethylene-based raw ma-



materials for the coatings industry. Mobay said capacities for the raw material and its derivative Desmodur W di-isocyanate, also known as hydrogenated MDI, will rise to 27,000 ton/year by September 1990. The project is estimated to cost \$25m.

### SARNEY APPROVES SERGIPE COMPLEX

Brazil's President Sarney has given the formal go-ahead for the construction of a chlorochemicals complex in Sergipe state. Earlier this year, Sarney awarded Sergipe a \$300m, 200,000 ton/year ethylene cracker to feed downstream projects in the Alagoas-Sergipe region.

Salgema has already been granted approval for the construction of units to produce 60,000 ton/year dichloroethane, 150,000 ton/year propylene oxide.

As part of the industrial complex to be built around Sergipe, fertilizers producer Nitrofert has signed a letter of intent to invest \$300m in a 330,000 ton/year ammonia/urea plant. Nitrofert already operates an identical plant at nearby Laranjeiras.

### NESTE PLANS PAO UNIT

Neste Chemicals is moving into the polyalphaolefins business with plans to build a \$20m 20-25,000 ton/year Belgian facility.

Based on proprietary technology, the Belgium-based plant is due on-stream at the end of next year. This signals a further step towards a more comprehensive, high value-added product range for the Finnish company.

Demand for polyalphaolefins in Europe topped 40,000 ton/year in 1988, Neste claims. No European plants specialize in polyalphaolefins production at the moment,

and demand is met by imports from the US.

### DOW IN HUNGARIAN JV

Dow Chemical has formed a joint venture with Hungarian partners to manufacture Styrofoam. Recently the US firm finalized details of the \$14m joint venture, to be called Nike, with Hungary's Nitro Kemia and the trade organization Chemolimpex.

Nike has also finalized details of raw materials sourcing. Hungarian benzene is to be transported to Montedipe in Italy for styrene production. Styrene will then be sent back to Hungary where it will be polymerized by the Hungarian-Montedipe joint venture Dynamont which will supply polystyrene to Nike.

### H<sub>2</sub>O<sub>2</sub> EXPANSION

Oxychem Canada, the joint venture between France's Air Liquide and Atochem, is to double production capacity of hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) to 40,000 ton/year. The venture will cost Can-\$18m (\$15.2m), and production will take place at the existing plant.

This move will provide the firms with 12 per cent of the world market.

### HI-TECH TEFLON

Forget the frying pan; Teflon has gone high-tech. Recently Du Pont (Wilmington, DE) announced the commercial availability of Teflon AF, a line of amorphous fluoropolymers. AF is not ultra-slippery, like the more well-known forms of polytetrafluoroethylene that Du Pont came out with 50 years ago. Rather its claims to fame are, according to the company, the lowest known

dielectric constant of any plastic, high temperature resistance up to 300°C; high light transmission with low refraction from ultraviolet through infrared; and limited solubility in certain perfluorinated solvents. Tom Darling, venture manager for AF, says the material was developed in the 1970s but has seen intensive research and investment for only about five years. "The driving factor in development was a joint project with Mitsubishi Rayon to produce an optical fibre to withstand harsh environments where glass fibers were impractical," he says. Du Pont has been supplying the material on a trial basis from its research facilities, and expects to bring a "world-scale plant on line" in August at its Fayetteville, NC facility. Other possible applications include semiconductor components and protective coatings that are cast, sprayed, or brushed on.

### NEW HOPE FOR PARKINSON'S PATIENTS

The drug levodopa is used to treat symptoms of severe Parkinson's disease, including slowness of movement, muscular rigidity, and frequent falls. But it often loses effectiveness over time, and higher doses lead to serious side effects. Now the Food and Drug Administration has approved selegiline as an adjunct drug for use with levodopa. The FDA says that the drug combination gives patients "greater relief of symptoms at the same time as achieving reductions in levodopa dose." Orphan drug status gives companies financial incentives to develop drugs that otherwise might not be profitable enough to produce. Somerset Pharmaceuticals (Denville, NJ) will sell the drug as Eldepryl.



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## News From Japan

### **PET'CHEM. BUSINESS FACES BRIGHT FUTURE: REPORT**

A subcommittee attached to the Chemical Industry Committee belonging to the Industrial Structure Council has compiled a report envisaging the form the Japanese chemical industry should take in the 1990s.

According to the report, domestic demand for petrochemicals will increase in proportion to Japan's GNP growth rate, while world demand for them will expand annually at the rate of 4%.

Japanese demand for ethylene is expected to reach 6.3 million tons in 1995 and 7.1 million tons in 2000 since it is forecast that domestic demand for ethylene derivatives will attain an annual growth rate of 3-4%. Domestic production capacity for the product is reckoned to stand at 5.9 million tons and 6.6 million tons, respectively in these years. The report claims that ethylene will not be in short supply in Japan since the country's supply capacity for the product is likely to amount to 5.8 million tons in 1989 and 6.2 million tons in 1990.

According to the report, there will be a very fair possibility of the estimated production for 1995 "being considerably different from actual trends". Six construction plans for ethylene plants — which have been worked out by Japanese petrochemical companies — will be hotly debated from now on. The report also points out that private business should, in principle, build new ethylene plants at their own risk and push forward co-operative ethylene production in a bid to

establish a supply system compatible with actual demand.

In addition, it claims that the petrochemical industry should make globalization, co-operation and individualization its three basic principles and that the government should supply it with comprehensive information helping the domestic petrochemical market function properly.

If all these steps are taken smoothly, "the petrochemical business will act as a prime mover for the chemical industry as a whole and contribute to creation of a new chemical age in the 21st Century," says Manager A. Jirco of MITI's Basic chemicals Division.

### **DU PONT TO MARKET KANSAI PAINT'S ELECTRODEPOSITION PHOTORESIST**

Kansai Paint Co. and Du Pont (U.S.) have agreed to tie up for business operations involved with electrodeposition-type photoresist designed to form fine circuit patterns on (printed circuit) boards.

In accordance with the bilateral agreement, the U.S. chemical giant will obtain rights for exclusively marketing Kansai Paint's "Sonne EDUV" electrodeposition-type photoresist in countries throughout the world excluding Japan and China. The product will be sold in Japan via Kansai Paint and Du Pont Japan Ltd.

Du Pont will have production rights for the photoresist covering the States and Europe while the Japanese company will hold those for the Pacific area.

They will co-operate in the development of electrodeposition material for printed circuit boards and coating technology.

"Sonne EDUV" serves to form water-soluble thin acrylic resin film upon (printed circuit) boards using an anionic electrodeposition process, which is also employed as corrosion-resistant coating technology for automobiles. Unlike dry-film and solder resists, it is capable of reducing film thickness to roughly 25 microns.

The business tie-up is intended to command the world market for electrodeposition type photoresist — next-generation photoresist for printed circuit boards—by combining their production technology and marketing capability. Du Pont is the world's largest maker of dry film-type photoresist.

### **NEW PLANT PLANNED FOR POLYURETHANE RAW MATERIAL**

Sumitomo Bayer Urethane Co. is to build a 30,000-t/y plant for diphenylmethane — 4,4'-diisocyanate (MDI) — raw material for polyurethane — at its Ehime factory with start-up scheduled for 1991.

The company already has a 37,000-t/y MDI plant at the same factory. Completion of the new plant will thus expand the production capacity concerned to 67,000 tons a year. The new plant's production capacity will be scaled up in line with actual supply-and-demand trends.

There is growing demand for polyurethane both at home and overseas for use in automotive bumpers and interior materials, insulating material for house-



electrical appliances, fiber artificial leather, etc., Domestic demand for polyurethane hitherto continued to show annual growth rate of roughly 10%.

Automobiles and household electrical appliances have come to be produced on a large scale in Southeast Asia. Along with this, polyurethane consumption and MDI imports from Japan are markedly expanding there.

Sumitomo Bayer Urethane decided on the plant construction on the basis of a forecast that MDI demand in Japan would continue to increase by at least 3% per annum. Bayer (West Germany)'s new technology will all be employed for the new plant.

In a related development, Sumitomo Chemical is revamping the 50,000-t/y aniline plant at the Ehime factory in a bid to scale up the production capacity involved to 80,000 tons a year. Increased output of aniline — raw material for MDI — will be supplied to Sumitomo Bayer Urethane. MDI operations in Japan will be intensified in the wake of successive production expansions and the appearance of a newcomer.

### **TEIJIN STRIVING TO STEP UP DIAGNOSTIC-AGENT OPERATIONS**

Teijin Ltd., is building up its domestic marketing system for diagnostic agents in a effort to enable annual sales of the products reaching Yen 5,000 million five years hence.

With the aim of expanding product offerings, the company tied up last June with Serono (Switzerland) and obtained rights for exclusively selling in Japan the latter's diagnostic agents — EIA agents in particular. As a matter of fact, it re-

cently started marketing Serono products.

It also teamed up last March with Shino — Test Laboratory (Japan) with regard to co-operative marketing of diagnostic agents. The latter has a strong marketing network for biochemical diagnostic agents, while the Swiss company has commercialized the world's largest number of drugs for obstetrics and gynecology.

Teijin plans to conduct clinical tests on about 30 items of Serono's diagnostic agents and start marketing them as well as inhouse-developed ones.

To date the company has emphasized R & D for diagnostic agents covering circulatory/respiratory organs, immunity and bone metabolism. It has been marketing an  $\alpha$  2 plasmin inhibitor/plasmin complex and an  $\alpha$  2 plasmin inhibitor, both of which are used for early diagnosis of disseminated intravascular coagulation (DIC). In addition, it has applied to the authorities concerned for production approval on a new agent designed to measure protein C and is pushing forward development of various diagnostic agents.

### **3 BIOTECHNOLOGY RESEARCH THEMES PICKED OUT: MITI**

MITI has selected development of chromosome-engineering technology, sugar-chain designing technology and biodegradable plastics as three themes for biotechnology research.

The three projects will be inaugurated next fiscal year with development terms and funds set at 10 years and Yen 15 billion in each case.

They are aimed at controlling cellular functions by elucidating the chromosome, synthesizing

artificial sugarchains by examining natural ones and producing macromolecular material having no harmful ecological effects, respectively.

MITI regards 1989 as being the first year for 2nd-generation biotechnology.

### **FUJISAWA TO PROMOTE DRUG MARKETING BY DOUBLING NUMBER OF BRANCH OFFICES**

Fujisawa Pharmaceutical Co. is scheduled to double this fall the number of its branch offices (10 at present), in an attempt to build up marketing activities. The locations concerned have yet to be decided on. The company has notified major distributors of the marketing expansion plan.

Major Japanese drug makers tend to beef up their marketing systems by increasing branch offices and thereby activating corporate structure. This is because they have already employed a large number of detail men.

Fujisawa employs 1,300 detail men — the 3rd-largest number among domestic drug makers — and recruited this year 40 more, which is nearly equivalent to the number expected to leave the company within a year. It intends to keep down personnel increases as much as possible.

The company originally based in Osaka, located last October a semi head office in Tokyo so that it could step up all-round health-care operations. In connection with this, it moved four of six marketing divisions to the Tokyo office and concentrated assignment of all project managers therein. The Tokyo office envisages commanding 5% of the Tokyo drug market as in the case with the Osaka head office.



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## New Developments From Japan

### SUPERPLASTIC AL-LI ALLOY JOINTLY PIONEERED

Sumitomo Light Metal Industries, Ltd., and Mitsubishi Heavy Industries Ltd., have jointly developed superplastic aluminum-lithium alloy by precisely controlling the microstructure of the alloy in a manufacturing process. The superplastic molding speed of the new product is roughly 10 times that of existing alloys.

Since the new product can be subjected to monolithic molding, it will find promising outlets in the aerospace field, in which supply of light-weight material has been hoped for. It is as strong as extra-superduralumin, which is currently used as major material for aerospace equipment.

To date it has been impossible to subject conventional type aluminum-lithium alloy to superplastic molding since it is apt to become anisotropic when being transformed into sheet.

Aluminum-lithium alloy is a novel material for the coming age: when 1% of lithium is added to aluminum, the specific strength of the resultant alloy increases by 10%. It is regarded as high-performance material for next-generation aerospace equipment and is being energetically developed both at home and overseas — in the United States in particular.

Seven Japanese makers of rolled aluminum established last March an R & D company called Alithium, Ltd.

### SEAWEED-REPELLENT PAINT FOR FINISHING NETS BARED

Mitsubishi Metal Corp. and Dai Nippon, Torio Co., have jointly developed a seaweed-repellent paint (trade name: MF-200F) for fishing nets. The new product will substitute for tributyltin oxide (TBTO), which was once extensively employed as a seaweed-repellent agent for fishing nets. The new product will substitute for tributyltin oxide (TBTO) which was once extensively employed as a seaweed-repellent agent for fishing nets used in yellowtail farming.

The two have produced fine particles of copper/nickel alloy using a water-atomizing process and manufactured the said paint therefrom. The new product contains nickel at the rate of 10% and the fine particles measure several ten microns. Market prices for the product will be a little higher than those for TBTO.

Japaneses demand for TBTO stands at 1,300 tons a year including 300 tons for use in fish farming. Use of the product for fishing nets has been banned in Japan since last year because outflow of the organic tin from the seaweed-repellent agent resulted in the breeding of deformed yellowtails.

The new paint features long life: it is capable of maintaining its seaweed-repellent properties for more than six months (fishing nets are usually replaced in six-month cycle). The product has passed safety tests conducted by a fishermen's association. They prove that there

is no problem with the nickel content concerned.

Mitsubishi Metal is scheduled to supply the said alloy powder to Dai Nippon Torio, which will start marketing the promising paint this fall.

### HITACHI TO OBSERVE MAGNETIC FORCE IN SUPERCONDUCTORS

A Hitachi Ltd., research team succeeded in using electron holography to observe magnetic lines of force (fluxoid quanta) passing through a superconductor, which will lead to a better understanding of superconductors.

Dr. A. Tonomura, head of the research team, said at a press conference that his team was able to observe the location of the fluxoid quanta and ascertain quantitatively the magnetic field.

Fluxoid quanta are found in niobium and titanium metal fabricated semiconductors. A high magnetic field intensity or loss of a superconducting stage can occur by the force that acts on fluxoid quanta when current is passed through a superconductor.

The Hitachi team first cooled a thin film of superconducting material to 2.5 Kelvin (minus 270.5 Celsius) while applying a magnetic field. Then it created a three-dimensional image (holograph) by using a laser beam to view the fluxoid quanta entering the lead sample, Tonomura said.

E. Maruyama, general mgr. of Hitachi's advanced research laboratory in Kokubunji, Tokyo, said that by observing the magnetic flux flowing through the superconducting material, it



be able to identify resistance points and understand the mechanisms manipulating superconductors better.

Tomomura's method of observation is expected to contribute research in next generation high-speed electronic devices such as quantum flux parametrons and fluxon propagators.

The Hitachi teams' work will appear in the May 22 issue of physical review letters published by the American Physical Society.

### **SINGLE-CRYSTAL SUBSTRATE FOR THIN-FILM SUPERCONDUCTOR PIONEERED**

Shin-Etsu Chemical Co. has successfully produced single-crystal  $\text{LaGaO}_3$  using the Czochralski process. The new product has a cylindrical form (diameter: 40 mm, length: 50 mm) and is regarded as a promising substrate for thin film of  $\text{YBaCuO}$ -based superconductive oxides.

Production of thin-film superconductors calls for the supply of large-diameter, high-quality substrates whose crystal-lattice constant is close to that of an epitaxial layer. The superconductors are produced by means of an epitaxial process.

The company claims that the new product is the best substrate for  $\text{YBaCuO}$  superconductors in terms of inductivity, crystal-lattice constant and reactivity with a superconductor film. Up until now  $\text{MgO/SrTiO}_3$  single crystals have been used as substrates for  $\text{YBaCuO}$  superconductors.

The company is aiming at completely eliminating twin crystals (crystal defects) from the said substrate, further en-

larging substrate diameter and developing  $\text{LaAlO}_3$  and rare-earth perovskite crystals for use in substrates for thin-film superconductors.

R & D for high-temperature, thin film superconductors is being aggressively conducted throughout the world. They are expected to facilitate production of high-performance Josephson devices, superconductive transistors and superconductive quantum interference devices and, what is more, help produce large-area orientation film and novel material and elucidate the superconductive mechanism.

### **POLYSTYRENE SURFACE MADE BIOCOMPATIBLE; STUDY**

A research group at National Cardiovascular Center has succeeded in turning the surface of macromolecular material biocompatible (hydrophilic) by applying ultraviolet rays thereupon.

They reacted aminated dimethylacrylamid copolymer with a reagent having activated ester and phenylazide groups, thereby synthesizing a hydrophilic copolymer having a phenyl-azide group as a side chain. As a follow-up step, they dissolved the co-polymer in methanol, coated the resultant product on polystyrene, transformed the modified polystyrene into film and applied ultraviolet rays thereupon.

A hydrophilic layer was thereby formed upon the polystyrene film. In addition, the research group made the film absorb optically active albumin-which was produced through reaction between the abovementioned reagent and buffer solution

(pH: 8.5) and applied ultraviolet rays thereupon, thus immobilizing the albumin on the surface of the polystyrene film. They claim the modified polystyrene film has high-level compatibility with the living body.

In the new process, it is possible to manipulate ultraviolet rays using optical fibre and treat the surface of targeted materials at normal temperature and under normal pressure. The process will be applied to the surface treatment of artificial blood vessels and internal organs.

### **KAWASAKI TO BUILD NEPAL'S LARGEST INDUSTRIAL PLANT**

A full turnkey contract was signed by Nepalese authorities and representatives of Japan's Kawasaki Heavy Industries on construction of a cement plant at Jaljale in Udayapur, East Nepal.

Japan's overseas economic co-operation fund has made available Yen 18,770 million to Nepal for setting up the plant, which will be capable of producing 840 tons of cement per day.

Japan's Onoda Engineering and Consulting Ltd. has been providing consultancy service regarding the plant which will be built by Kawasaki Heavy Industries and another Japanese firm, Toyo Menka Kaisha, Ltd.

Construction of the plant, described as the kingdom's largest industrial project, will begin this year & is targetted to be completed in 1992.

It will go into trial production the same year.

Nepalese Minister for Industries Rabindranath Sharma is scheduled to lay the foundation stone of the plant.



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# CHEMICAL WEEKLY BUYER'S GUIDE EIGHTH EDITION

Four years after the publication of our last **CHEMICAL WEEKLY BUYER'S GUIDE**, (*Seventh Edition*) we at **SEVAK PUBLICATIONS**, are pleased to announce our plans for publication of the Eighth Edition.

The last four years have seen a considerable growth in the chemical industry, both in terms of size and range of products manufactured, traded or imported. Consequent to such a growth has arisen an imperative need for a systematic source-book to detail the activities of the industry all over the country.

The **CHEMICAL WEEKLY BUYER'S GUIDE, EIGHTH EDITION** coming in the tradition of seven previous editions strives to fill this gap.

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- \* Chemical Manufacturers
- \* Chemical Dealers
- \* Indenting Agents

All the above will be suitably and conveniently indexed so as to permit easy and rapid access to information.

In addition, it is also proposed to cover the following:

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# CHEMICAL WEEKLY BUYER'S GUIDE EIGHTH EDITION

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# CHEMICAL WEEKLY BUYER'S GUIDE

EIGHTH EDITION

SEVAK PUBLICATIONS

306, Shri Hanuman Industrial Estate, G.D. Ambekar Road, P.B. No. 7110, Wadala, Bombay 400 031.

Plans are now afoot to bring out the Eighth Edition of our **CHEMICAL WEEKLY BUYER'S GUIDE**. Among the many features being planned is a comprehensive listing of manufacturers/dealers/indenting agents of chemical and allied products, chemical plant & equipment, instruments, machinery etc. To make the **BUYER'S GUIDE** an authentic source-book we seek your co-operation. Kindly fill in this questionnaire and return it to the address shown above, as early as possible. **PUBLICATION OF YOUR ENTRY IN THE BUYER'S GUIDE IS ENTIRELY FREE AND WITHOUT ANY OBLIGATION**. When filling up this questionnaire be as detailed as you please. For convenience of indexing do not use abbreviations for chemicals and use only generic names. Trade names where mentioned should be accompanied by generic names. If space in this form seems insufficient do not hesitate to give details separately.

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Branches :

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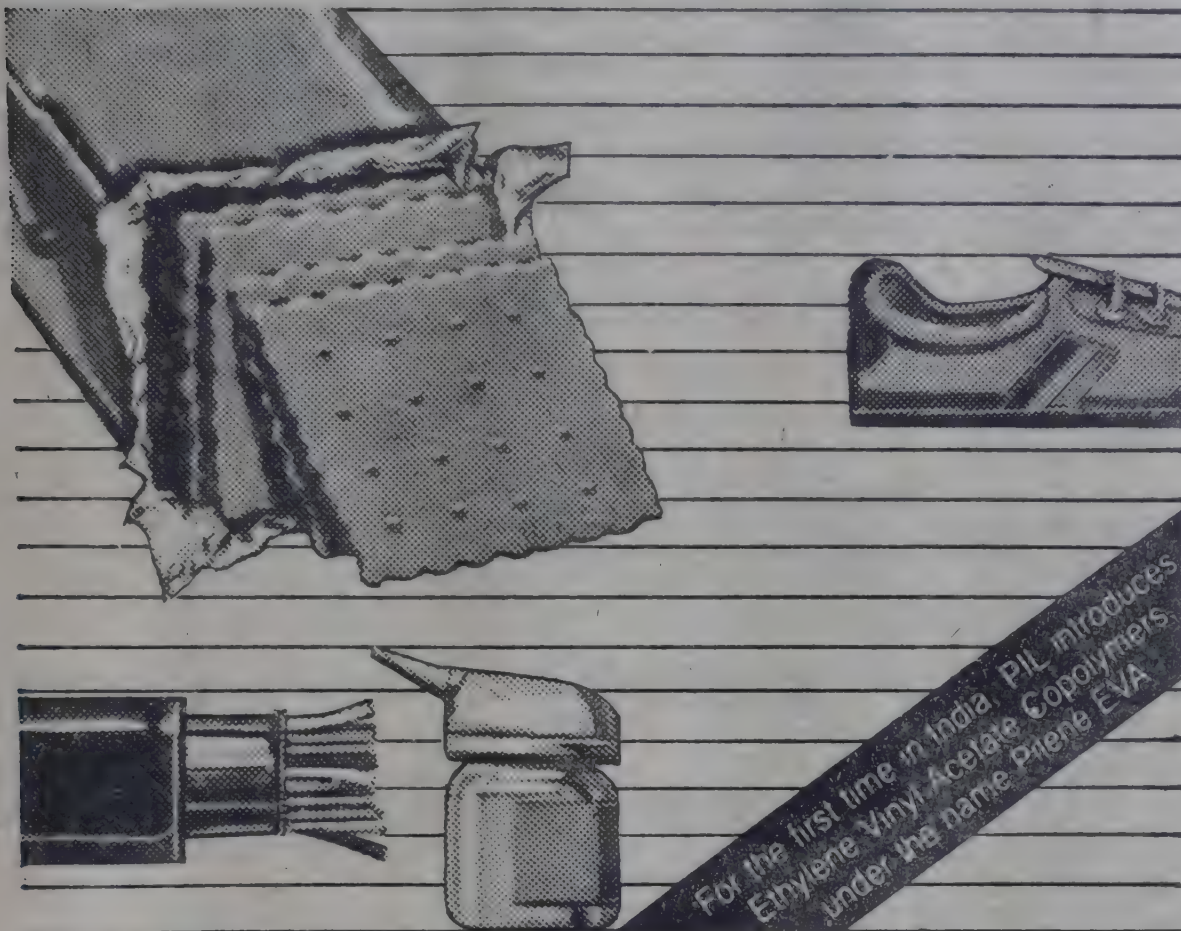
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Authorised Dealers: THE DHARAMSI MORARJI CHEMICAL CO. LTD.



## Company Notes

### MAFATLAL DYES

Mafatlal Dyes and Chemicals share capital has been reduced from Rs. 2.52 crores to Rs. 1.68 crores effective 21st June, 1989, consequent upon the Company's foreign collaborator, Hoechst AG, withdrawing its share in the company's share capital.

Depressed conditions in the textile industry, combined with the shortages of dyestuffs, optical brighteners and sodium hydrosulphite, in which the company deals, adversely affected the sales of the products to the textile sector. In spite of the severe competition from the small-scale sector and also from a manufacturer of vinyl acetate monomer, a key raw material used in the manufacture of dispersions, the company could increase its sales of synthetic resin dispersions, as the company successfully introduced some new dispersions.

For the 15-month period ended on 31st March, 1989, sales amounted to Rs. 52.63 crores as against Rs. 42.65 crores, for the 12-month period ended on 31st December, 1987.

The profit before tax has increased from Rs. 200.62 lakhs (for 12-month period) to Rs. 264.57 lakhs (for 15-month period) showing a rise of about 5% on an annualised basis.

Net profit after tax amounted to Rs. 148.57 lakhs (Rs. 110.62 lakhs) after providing Rs. 13.69 lakhs (Rs. 17.36 lakhs) for depreciation and Rs. 116 lakhs (Rs. 90 lakhs) for taxation. The proposed dividend will claim Rs. 28.56 lakhs (Rs. 42.84 lakhs). A sum of Rs. 120 lakhs (Rs. 60 lakhs) has been transferred to General Reserve and the balance amount of Rs. 93.11 lakhs has been carried forward.

The Board of Directors have recommended a dividend of 17% for the 15-month period as against 17%

declared in the previous year, and also the issue of one bonus share for every four shares held by the shareholders, by capitalising Rs. 42 lakhs from General Reserve.

#### Financial Results

For the year ended on 31st March, 1989

|                                               | 1988-89<br>(15 months)<br>(Rs. in<br>lakhs) | 1987-88<br>(12 months)<br>(Rs. in<br>lakhs) |
|-----------------------------------------------|---------------------------------------------|---------------------------------------------|
| <b>Turnover</b>                               | <b>5,263.19</b>                             | <b>4,265.49</b>                             |
| Profit before<br>Depreciation and<br>Taxation | 278.26                                      | 217.98                                      |
| Less: Depreciation                            | 13.69                                       | 17.36                                       |
| <b>PROFIT BEFORE<br/>TAX</b>                  | <b>264.57</b>                               | <b>200.62</b>                               |
| Less: Provision for<br>Tax                    | 116.00                                      | 90.00                                       |
| <b>PROFIT AFTER<br/>TAX</b>                   | <b>148.57</b>                               | <b>110.62</b>                               |
| Add: Balance of<br>profit of previous<br>year | 93.10                                       | 85.32                                       |
| <b>Profit available for<br/>appropriation</b> | <b>241.67</b>                               | <b>195.94</b>                               |
| Proposed<br>Appropriation                     |                                             |                                             |
| Dividend                                      | 28.56                                       | 42.84                                       |
| Transfer to Gen-<br>eral Reserve              | 120.00                                      | 60.00                                       |
| Balance carried<br>forward                    | 93.11                                       | 93.10                                       |
|                                               | <b>241.67</b>                               | <b>195.94</b>                               |

The directors have recommended a dividend of 17% absorbing Rs. 28.56 lakhs on reduced equity share capital of Rs. 1.68 crores (previous year : 17% -- Rs. 42.84 lakhs on equity share capital of Rs. 2.52 crores).

### BOMBAY DYEING REPEATS

As a sequel to the steep hikes in raw material costs and in particular, the cost of the imported paraxylene, Bombay

Dyeing and Manufacturing Company could just manage to earn an unchanged gross profit of Rs. 41.83 crores during the year ended March 1989 compared to Rs. 41.74 crores in the previous year.

The turnover has gone up to 17 per cent to Rs. 361 crores. The gross margins have, however, declined to 11.58 per cent from 13.55 per cent. The dividend is unchanged at 30 per cent.

After depreciation (Rs. 20.49 crores against Rs. 18.79 crores) and taxation (Rs. 3.31 crores against Rs. 3.59 crores), the net profit has dipped by 6.82 per cent to Rs. 18.03 crores from Rs. 19.35 crores a year ago. Adding the previous year's balance surplus (Rs. 30.10 crores against Rs. 16.29 crores), the disposable profit is, on the other hand, up to Rs. 48.13 crores from Rs. 35.65 crores in the preceding year.

Out of this, the proposed dividend will claim Rs. 3.37 crores like last year. It has allocated Rs. 0.75 crores against nil to the investment allowance reserve, Rs. 0.23 crores against same to debenture redemption reserve and Rs. 1.73 crores against Rs. 1.94 crores to general reserve.

The balance Rs. 42.05 crores against Rs. 30.10 crores is to be carried forward. The sharp increase in the cost of imported paraxylene, on which the company is wholly dependent for its DMT production, has made a significant erosion in the margins. It held the DMT price despite this substantial rise in raw material costs for five months and then raised it only to offset the cost increase when it became clear that the expected reduction in import duty on paraxylene would not be forthcoming as early as expected.

The plant continued to operate satisfactorily and demand for DMT was buoyant. Production as well as its sale during the year exceeded the design capacity of 60,000 tonnes per annum.



However, problems associated with the key raw material, paraxylene, have remained a major obstacle.

While the customs duty has been reduced from 120 per cent to 90 per cent in the Budget for 1989-90, it has still not brought about the parity between the cost of imported paraxylene used by the company and the indigenous one used by its competitors.

The company, has therefore, urged the Government, in the interest of fair and equitable competition, to ensure that all producers of DMT and PTA obtain their major raw material, namely, paraxylene at the same price.

Effective from March 1, 1989, the import of paraxylene has been canalised through Indian Petrochemicals Corporation (IPCL).

Its export performance of Rs. 32.31 crores is at the same level as last year in spite of reduced international demand for textiles and the lower price realisation in the first half of the year. The textile export markets have picked up recently and the company expects to improve its performance during the current year 1989-90.

With the continuous depressed conditions in the textile market, the margins of its sales were under pressure. With the emphasis on modernisation and cost reduction, the company has been able to maintain its performance during a period when reports of mill closures and cuts in production have become commonplace.

#### BORAX MORARJI

Borax Morarji has fared well during the year ended March 1989. The directors have recommended a dividend of 25 per cent (same last year) and an additional dividend of five per cent to mark the Silver Jubilee of the company. The dividend proposed for the year thus works out to 30 per cent. The dividend

will absorb Rs. 32 lakhs against Rs. 26.67 lakhs.

The turnover during the year amounted to Rs. 17.39 crores against Rs. 17.33 crores and earned a gross profit of Rs. 130.31 lakhs against Rs. 110.53 lakhs. After depreciation (Rs. 11.61 lakhs against Rs. 5.81 lakhs), taxation (Rs. 50 lakhs against Rs. 39 lakhs) and other adjustments, the net profit available for appropriation amounted to Rs. 68.70 lakhs against Rs. 63.62 lakhs. After the proposed dividend, a sum of Rs. 36.70 lakhs against Rs. 36.95 lakhs has been transferred to general reserve.

The production of both borax and boric acid was marginally lower representing utilisation of respective plant

capacities to the extent of 70.39% and 105.06% against 75.95% and 109.10% in the previous year. However, there was increase in the production of anhydrous borax and boric acid SQ. Production of hydrous borax increased to 115 tonnes against 86 tonnes while that of boric acid SQ increased to 78 tonnes from 49 tonnes.

#### COLOUR CHEM LIMITED

At a meeting held on July 6, 1989, the Board of Directors of the company considered and approved the statement of accounts of the company for the year ended 31st March 1989. The following table is an account of the financial results of the company with the appropriations made and the dividend recommended by the Board of Directors.

#### Financial Results -- 1988-89

|                                                                                                | 1988-89           | 1987-88  |
|------------------------------------------------------------------------------------------------|-------------------|----------|
|                                                                                                | (Rupees in lakhs) |          |
| Total income (including excise and other income)                                               | 10,602.92         | 8,940.23 |
| Gross Sales                                                                                    | 10,146.86         | 8,651.44 |
| Net Sales                                                                                      | 8,645.80          | 7,324.48 |
| Profit before interest, depreciation and tax                                                   | 1,146.83          | 1,064.66 |
| Interest                                                                                       | 501.24            | 410.00   |
| Depreciation                                                                                   | 238.98            | 230.94   |
| Profit before tax                                                                              | 406.61            | 423.72   |
| Provision for tax                                                                              | 105.00            | 125.00   |
| Profit after tax                                                                               | 301.61            | 298.72   |
| Add:                                                                                           |                   |          |
| Transfer from Investment Allowance Reserve A/c.                                                | 51.60             | 20.00    |
| Excess/(short)provision for taxation of previous years                                         | 12.31             | (14.50)  |
| Balance brought forward from last year                                                         | 93.82             | 85.91    |
|                                                                                                | 157.73            | 80.41    |
|                                                                                                | 459.34            | 384.63   |
| Less:                                                                                          |                   |          |
| Transfer to Export Profit Reserve Account                                                      |                   | 32.00    |
| Available for appropriation                                                                    | 459.34            | 352.63   |
| Appropriation:                                                                                 |                   |          |
| General Reserve                                                                                | 150.00            | 100.00   |
| Equity dividend (subject to deduction of tax) at Rs. 22 per share (previous year Rs. 20/share) | 174.69            | 158.81   |
| Balance carried forward                                                                        | 134.65            | 93.82    |
|                                                                                                | 459.34            | 352.63   |



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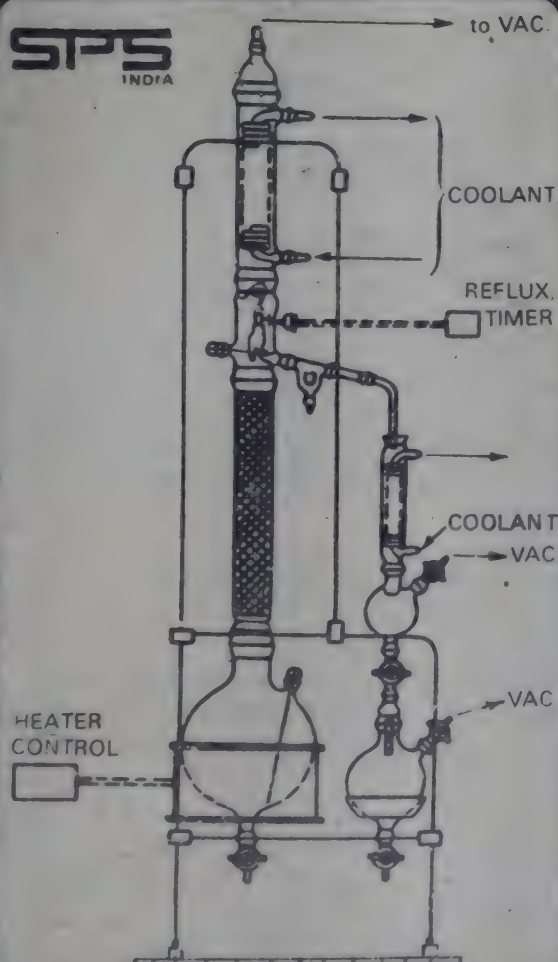
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# MARKET INFORMATION

## Forced Holiday for Markets

Due to unprecedented rains on July 24/25, the Bombay chemicals market wore a totally deserted look. Markets in Bombay took a forced holiday and trading came to a total halt as there were neither traders nor the commodity to trade in at any market as none, including suppliers,

could reach the centres of trading activity because of heavy rains and consequent disruption of transport systems.

Never in the recent years the trading activity was so seriously affected owing to difficulties in communication.

We cannot guarantee the accuracy of the prices published in **CHEMICAL WEEKLY** as they are based only on the enquiries made by our correspondent—and, as such they are not **FIRM PRICES** as between a buyer and seller. The prices are published only with a view to giving some ideas of the market conditions.

The prices are inclusive of Excise and Maharashtra Sales Tax.

(Prices as on July 25, 1989)

| INDUSTRIAL CHEMICALS      | Per Kg. |                                  |        |                                |        |
|---------------------------|---------|----------------------------------|--------|--------------------------------|--------|
| Ammonium sulphate         | 2.50    | Borax (Granular)                 | 15.00  | Cobalt oxide                   | 280.00 |
| Ammonium phosphate (Mono) | 14.50   | Borax (Powder)                   | 15.25  | Cresylic acid                  | 52.00  |
| Ammonium phosphate (Di)   | 14.00   | Boric acid (Tech)                | 28.00  | Camphor (Indian)               | 105.00 |
| Ammonium carbonate (Di)   | 17.00   | Bisphenol-A                      | 82.00  | Cream of Tartar (Tech.) China  | 70.00  |
| Ammonium bicarbonate      | 5.60    | Butyl carbijol                   | 110.00 | Citric acid (Belgium) (Resale) | 47.00  |
| Ammonium chloride         | 3.00    | Caustic soda (Flakes)            | 13.00  | Citric acid (Indian) (Resale)  | 47.00  |
| Ammonium nitrate          | 6.00    | Caustic soda (Solid)             | 12.00  | Copper sulphate                | 24.00  |
| Arsenic white powder      | 24.00   | Caustic soda (Lye)               | 10.00  | Chromic acid                   | 61.00  |
| Acrylamide (Resale)       | 85.00   | Calcium chloride 70% (Solid)     | 3.25   | Ethylene urea                  | 58.00  |
| Barium carbonate          | 6.00    | Calcium chloride 75-80% (fused)  | 3.50   | Ferric chloride (Lumps)        | 5.50   |
| Bleaching powder (33% Cl) | 4.20    | Calcium chloride 36% (Anhydrous) | 5.00   | Ferric chloride (Anhydrous)    | 16.00  |
|                           |         | Calcium carbonate (precipitated) | 4.25   | Glue flakes                    | 15.00  |
|                           |         | Calcium carbonate (Activated)    | 4.75   | Glue sheets                    | 6.75   |
|                           |         |                                  |        | Gohsenol GH-17                 | 115.00 |
|                           |         |                                  |        | Hydro                          | 40+ST  |

CHEMICALS

FERTILIZERS

SUGAR, CEMENT

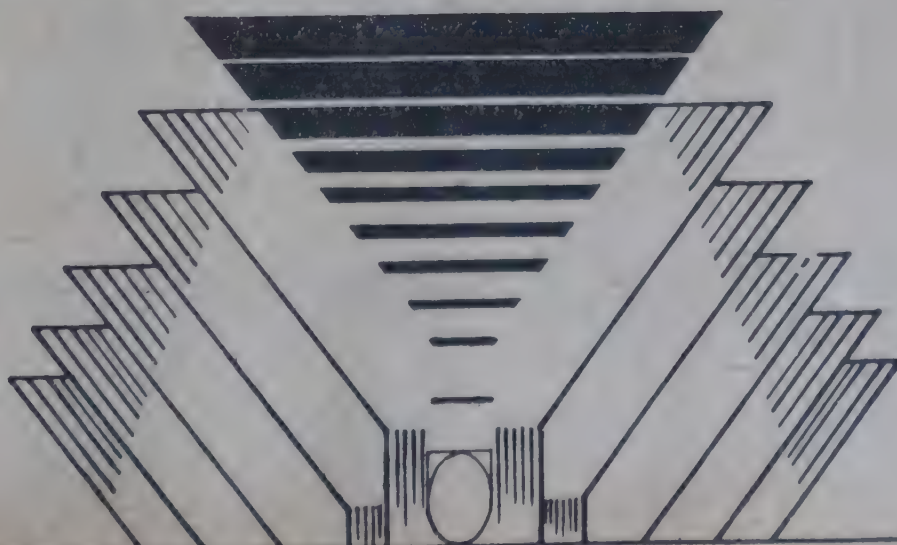
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DYES & INTERMEDIATES

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|---------------------------------|-----------|---------------------------------------|--------|--------------------------------|-------|
| Hyflosupercell                  | 19.00     | Sodium sulphide 58-60% (Flakes) (TCL) | 20.00  | Butanol                        | 34+ST |
| Hexamine (Resale)               | 35.00     | Sodium sulphide pure. (Flakes)        | 12.25  | Benzyl Alcohol                 | 60.00 |
| Industrial Wax                  | 25.00     | Sodium nitrite (Resale) per 50 kg.    | 680.00 | Benzyl Chloride                | 34.00 |
| Litharge                        | 40.00     | Sodium chlorite 80% (Spain)           | 88.00  | Benzo trichloride              | 16.00 |
| Lead Acetate (Tech.)            | 31.25     | Soda Ash (Tata)                       | 5.00   | Benzoyl chloride               | 22.00 |
| Lithopone                       | 18.50+ST  | Soda Ash (Birla)                      | 4.50   | Bromine Liquid                 | 68.00 |
| Magnesium chloride (Crystal)    | 1.25+ST   | Soda Ash (Imp.)                       | 4.50   | Chloroform                     | 31.00 |
| Menthol crystal (Flakes)        | 900+Ex+ST | Sodium bicarbonate                    | 7.50   | Carbon Tetrachloride           | 19.50 |
| Menthol bold                    | 665+Ex+ST | Sodium bisulphite                     | 4.50   | Cellosolve                     | 67+ST |
| Menthol crystal cold            | 700+Ex+ST | Sodium silicate                       | 3.00   | Cyclohexanone                  | 54+ST |
| Magnesium carbonate (Japan)     | 16.00     | Sodium acetate                        | 5.00   | Cyclohexanol                   | 58+ST |
| Magnesium carbonate (Indian)    | 18.00     | Sodium alginate                       | 250+ST | Diacetone (Resale)             | 34.00 |
| Maleic Anhydride (Resale)       | 39.00     | Titanium Dioxide (Anatase)            | 125+ST | Diethyl Oxalate                | 34.00 |
| Mercury (34.5 Kgs)              | 12,000.00 | Titanium Dioxide (Rutile - RCR)       | 140.00 | Diethyl glycol (DEG)           | 43.00 |
| Nickel chloride                 | 110.00    | Tartaric acid                         | 100.00 | Diethyl Phthalate              | 45.00 |
| Oxalic acid (Resale)            | 22.00     | Trisodium phosphate                   | 5.50   | Diallyl Phthalate              | 56.00 |
| Peppermint oil (Rectified)      | 195+Ex+ST | Thiourea                              | 80.00  | Dimethyl Phthalate             | 28.00 |
| Potassium carbonate (Indian)    | 30.00     | Urea (Tech.)                          | 2.90   | Diethyl Adipate                | 52.00 |
| Potassium carbonate (Imported)  | 32.00     | Vacuum salt                           | 1.00   | Dibutyl Adipate                | 42.00 |
| Potassium bichromate            | 32.50+ST  | Zinc Dust                             | 32.00  | Dipentene                      | 15.00 |
| Potassium phosphate (Mono)      | 14.00     | Zinc Oxide                            | 52.00  | Dimethylamine 40%              | 12.00 |
| Potassium phosphate (Di)        | 14.00     | Zinc chloride powder (Tech.)          | 12.50  | Dimethylamine 50%              | 14.00 |
| Polyvinyl alcohol (No. 117)     | 108.00    | Zinc sulphate                         | 7.00   | Ethyl Acetate                  | 21.00 |
| Polyvinyl alcohol (No. 173)     | 118.00    | <b>SOLVENTS</b>                       |        | Ethyl Acrylate                 | 65.00 |
| Polyvinyl alcohol (No. 208)     | 150.00    | <b>Per Kg.</b>                        |        | Ethylene Dichloride            | 14.50 |
| Paraformaldehyde (Resale)       | 23+ST     | Acetic Acid Glacial (Resale)          | 14.50  | Ethylene Glycol                | 48+ST |
| Phthalic anhydride 36% (Resale) | 27.50     | Acetic Anhydride (Resale)             | 31.00  | Formic Acid (Imp.)             | 26.50 |
| Pentaerythritol (Resale)        | 45.00     | Acetone (Resale)                      | 16.50  | Formaldehyde (Resale)          | 7.50  |
| Paraffin wax                    | 20+ST     | Adipic Acid                           | 57.00  | Glycerine (CP)                 | 55.00 |
| Rangolite (German)              | 80+ST     | Aceto Acetanilide                     | 55.00  | Glycerine (IW)                 | 52.00 |
| Rangolite (Czech.)              | 64+ST     | Aniline Oil                           | 68.00  | Hydrogen Peroxide 50% (Resale) | 28.00 |
| Sodium sulphate (Fine)          | 6.00      | Benzoate Plasticiser                  | 62.00  | Isopropyl Alcohol              | 38.00 |
| Sodium sulphate (Coarse)        | 5.00      | Butyl acrylate                        | 78+ST  | Isobutyl Alcohol (Resale)      | 30.00 |
| Sodium sulphide 50-52% (Flakes) | 11+ST     | Butyl stearate                        | 50.00  | Moncethanolamine (Resale)      | 65.00 |
|                                 |           |                                       |        | Melamine                       | 60.00 |
|                                 |           |                                       |        | Methyl Ethyl Ketone            | 45.00 |
|                                 |           |                                       |        | Methyl Isobutyl Ketone         | 58.00 |
|                                 |           |                                       |        | Methyl Acrylate                | 60.00 |
|                                 |           |                                       |        | Methyl Dichloride (Resale)     | 26.00 |

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Iso Butyl Alcohol  
Iso Propyl Alcohol  
Lithium Hydroxide  
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Methyl Formate  
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| Carbitol                      | 68+ST  |
| Meta Cresol                   | 60.00  |
| Nitrobenzene                  | 30.50  |
| Nitric Acid (Conc.) (RCF)     | 2.50   |
| Ortho Cresol                  | 30+ST  |
| Phenol (Resale)               | 37.00  |
| Propylene Glycol              | 55.00  |
| Polyethylene Glycol (No.200)  | 52.00  |
| Polyethylene Glycol (No.400)  | 53.00  |
| Polyethylene Glycol (No.500)  | 42.00  |
| Polyethylene Glycol (No.1600) | 14.00  |
| Polyethylene Glycol (No.4000) | 70.00  |
| Polyethylene Glycol (No.6000) | 85.00  |
| Para Cresol                   | 110.00 |
| Styrene Monomer               | 36.00  |
| Sorbitol                      | 14.00  |
| Sulphuric Acid                | 2.80   |
| Trichloroethylene             | 29.00  |
| Triethanolamine (Resale)      | 65.00  |
| Turpentine Oil (Germany)      | 8.00   |
| Turkey Red Oil (50%)          | 20.00  |
| Vinyl Acetate Monomer         | 47.50  |

| SOLVENTS              | Per Litre |
|-----------------------|-----------|
| Benzene               | 11.00     |
| N-Heptane             | 10.50     |
| N-Hexane              | 12.00     |
| Methanol              | 9.50      |
| Solvent Naphtha Heavy | 10.50     |
| Solvent Naphtha Light | 8.50      |
| Toluene               | 21.00     |
| Xylene                | 24.50     |

### DYES INTERMEDIATES (PRICES ARE WITHOUT TAX AND EXCISE)

|                                 |           |
|---------------------------------|-----------|
| Alphanaphthylamine              | 63.00     |
| Alpha Naphthol (Imp.)           | 190.00    |
| Aceto Acetic Ester (Methyl)     | 66.00     |
| Ammonium Molybdate              | 215.00    |
| Anthraquinone                   | 130.00    |
| Anthranilic Acid                | 75.00     |
| 2-Amino 4-Nitrophenol           | 150.00    |
| Blue B. Base (Local)            | 255.00    |
| Beta Naphthol (Atul)            | 75.00     |
| Benzidine Dihydrochloride (BDH) | 98.00     |
| Bromamine Acid                  | 500.00    |
| BON Acid                        | 130+Ex+Ta |
| Chicago Acid IRS                | 330.00    |
| Coach Acid                      | 55.00     |
| C. Acid (Imp.)                  | 165.00    |
| Cyanuric Chloride               | 135.00    |
| 2,4- DNCB                       | 31.00     |
| Dihydrothio PTOS (Imp.)         | 1,000.00  |
| Dimethyl Aniline                | 70.00     |
| Diethyl Aniline                 | 185.00    |
| Diamino stilbene                |           |
| disulphonic acid                | 165.00    |
| 3,3-DCB (Imp.)                  | 175.00    |
| Gamma Acid (Atul)               | 200.00    |
| H. Acid (Atul)                  | 110.00    |
| G. Salt                         | 75.00     |
| Isophthalic Acid                | 45.00     |
| J. Acid                         | 330.00    |
| J. Acid Urea                    | 400.00    |
| K. Acid                         | 127.00    |
| MPDS (German)                   | 190.00    |

|                                |        |
|--------------------------------|--------|
| MNA                            | 125.00 |
| Meta Ureido Aniline            | 235.00 |
| MPD (Local)                    | 215.00 |
| MPD (Japan)                    | 250.00 |
| Naphthenic Acid                | 40.00  |
| N-Methyl J. Acid               | 540.00 |
| N-Methyl Aniline               | 130.00 |
| Naphthalene (Refined)          | 21.00  |
| Ortho Anisidine (OA) (Imp.)    | 105.00 |
| Ortho Dichloro Benzene (ODCB)  | 16.00  |
| OT Base                        | 117.00 |
| Para Dichloro Benzene (PDCB)   | 27.00  |
| Para Anisidine (PA local)      | 150.00 |
| PNA                            | 105.00 |
| Para Cresidine (Imp.)          | 400.00 |
| Para Amino Azo Benzene (India) | 190.00 |
| PNCB                           | 49.00  |
| Para Amino Acetanilide         | 170.00 |
| 1-Phenyl 3-Methyl 5-Pyrazolone | 150.00 |
| Phenyl J. Acid                 | 375.00 |
| Para Amino Benzoic Acid        | 135.00 |
| PT Base                        | 165.00 |
| Rhoduline Acid                 | 530.00 |
| Resist Salt 80%                | 34.00  |
| Resorcinol                     | 190.00 |
| Sodium Naphthionate            | 67.00  |
| 5-Sulpho-Anthranilic Acid      | 82.00  |
| Sulphanilic Acid               | 52.00  |
| Sulpho Tobias Acid             | 165.00 |
| Trichloro Benzene (TCB)        | 22.00  |
| Tobias Acid                    | 170.00 |
| Metanilic Acid                 | 48.00  |
| MTD                            | 114.00 |

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| Acid Maroon V                     |    | 110.00  | Brill. Fast Helio 2RS    | 177.30       | Red FB            |  | 425.80 |
| Acid Orange II                    |    | 112.55  | Brill. Fast Helio BS     | 116.10       | Red Violet FBL    |  | 622.00 |
| Acid Orange ILY                   |    | 93.85   | Brill. Violet Extra      | 181.45       | Orange 3R         |  | 254.20 |
| Acid Red A                        |    | 137.00  | Blue 2B                  | 102.50       | Violet 3R         |  | 370.50 |
| Acid Scarlet 3R                   |    | 128.35  | Blue G                   | 220.45       | Violet RL         |  | 355.70 |
| Acid Red 3BN                      |    | *195.00 | Sky Blue FB              | 242.00       | Violet 6R         |  | 638.20 |
| Acid Red R2R                      |    | 132.00  | Copper Blue GR           | 190.25       | Scarlet RR        |  | 263.50 |
| Acid Red RS                       |    | 88.00   | Fast Greenish Blue GL    | 114.60       | Rubine 3B         |  | 289.10 |
| Acid Patent Blue AS               |    | *280.00 | Developed Black BT       | 149.95       | Rubine CB         |  | 449.50 |
| Acid Green V                      |    | *375.00 | Blue NB-2B               | 348.45       | Blue GL           |  | 419.00 |
| Acid Coomasi Blue                 |    | 200.00  | Blue NB-2BG              | 214.70       | Blue BGF          |  | 605.80 |
| Acid Yellow 5GN                   |    | 65.00   | Developed Black NB-GHB   | 214.70       | Navy Blue RE      |  | 359.80 |
| Acid Red PG                       |    | 85.00   | Green B                  | 142.75       | Brown 3REL        |  | 272.80 |
| Acid Red GRS                      |    | 78.00   | Green NB-B               | 218.90       | Black GEL         |  | 420.10 |
| Acid Black 10 BX                  |    | 157.15  | Green 2B-N               | 218.90       | Dark Brown 3B     |  | 411.10 |
| Acid Black BX                     |    | 126.95  | Brown MR                 | 197.40       |                   |  |        |
| Acid Black Wax                    |    | 135.50  | Brown CN                 | 137.00       |                   |  |        |
| Crosein Scarlet MOO               |    | 200.30  | Golden Brown G           | 175.85       |                   |  |        |
| Procinil Yellow GS (ICI, UK)      |    | 265.00  | Catechin G               | 155.70       |                   |  |        |
| Procinil Red GS (ICI, UK)         |    | 530.00  | Omega Tan                | 161.45       |                   |  |        |
| Procinil Blue RS (ICI, UK)        |    | 315.00  | Catechin GS              | 102.80       |                   |  |        |
| Procinil Scarlet G (ICI, UK)      |    | 600.00  | Black E Hly. Conc.       | 180.15       |                   |  |        |
| Procinil Orange G (ICI, UK)       |    | 250.00  | Black E Extra Hly. Conc. | 180.15       |                   |  |        |
| Procinil Rubine (ICI, UK)         |    | 550.00  | Black NB-ER Hly. Conc.   | 290.50       |                   |  |        |
| * To get resale price add 6% tax. |    |         |                          |              |                   |  |        |
|                                   |    |         |                          |              |                   |  |        |
| DIRECT COLOURS                    |    |         | Per Kg.                  | BASE COLOURS |                   |  |        |
| Yellow 3GX                        |    | 114.00  | Red B 3B Conc            | 611.50       | Fast Yellow GC    |  | 77.75  |
| Gun Yellow RCH*                   |    | 175.85  | Red B 2B Conc            | 797.90       | Fast Orange GC    |  | 126.40 |
| Fast Yellow GCH                   |    | 171.50  | Red CB Powder            | 1048.25      | Fast Scarlet R    |  | 198.05 |
| Yellow CFG Hly. Conc.             |    | 721.00  | Red D2B Powder           | 589.85       | Fast Scarlet RC   |  | 126.40 |
| Fast Yellow GS                    |    | 126.96  | Violet C 4R Conc.        | 1202.70      | Fast Scarlet RCR  |  | 126.80 |
| Fast Yellow CHRS                  |    | 116.85  | Blue BG Conc             | 580.65       | Fast Scarlet G    |  | 115.75 |
| Viscose Orange A                  |    | 210.35  | Blue BN Powder           | 128.20       | Fast Scarlet GN   |  | 92.95  |
| Fast Orange GR                    |    | 171.50  | Blue D 2R Powder         | 588.25       | Fast Scarlet GG   |  | 77.75  |
| Red                               |    | 122.65  | Navy BT Conc             | 531.95       | Fast Scarlet GGS  |  | 73.95  |
| Dark Tan                          |    | 98.15   | Blue B 2G Conc           | 577.95       | Fast Red B        |  | 233.50 |
| Red IIR                           |    | 98.15   | Black BT Conc            | 319.50       | Fast Red RC       |  | 115.75 |
| Red 4B                            |    | 217.55  | Blue BR                  | 482.40       | Fast Red R Flakes |  | 153.80 |
| Bordeaux BW                       |    | 170.10  | Yellow REL               | 513.20       | Fast Red TR       |  | 181.60 |
| Fast Scarlet 4BS                  |    | 223.50  | Yellow 5RX               | 269.90       | Fast Red TR Oil   |  | 223.35 |
| Red 12B                           |    | 220.45  | Yellow 3G                | 473.20       | Fast Red RL       |  | 251.20 |
| Bordeaux Hly. Conc.               |    | 249.20  | Yellow                   | 140.00       | Fast Red KB Oil   |  | 251.20 |
| Cotton Red N                      |    | 117.05  | Yellow AL                | 167.20       | Fast Bordeaux GP  |  | 236.00 |
| Brill. Fast Helio E               |    | 362.85  | Yellow Brown REL         | 311.70       | Fast Garnet GBC   |  | 123.25 |
|                                   |    |         | Yellow FFL               | 571.40       | Fast Violet B     |  | 548.80 |
|                                   |    |         | Gold Yellow GG           | 320.80       | Fast Blue E3      |  | 566.50 |
|                                   |    |         | Pink REL                 | 593.00       |                   |  |        |
|                                   |    |         | Red REL                  | 615.60       |                   |  |        |
|                                   |    |         |                          |              |                   |  |        |
|                                   |    |         |                          |              |                   |  |        |
|                                   |    |         |                          |              |                   |  |        |
|                                   | </ |         |                          |              |                   |  |        |



|                       |                |                              |                |                                |         |
|-----------------------|----------------|------------------------------|----------------|--------------------------------|---------|
|                       | 369.00         | Blue H-FRD                   | 305.80         | Brill. Purple 2R Hly Conc.     | 744.25  |
|                       | 336.05         | Navy Blue H3R                | 333.75         | Brill. Purple 4R Supra Disp.   | 604.25  |
|                       | 236.00         | Blue H 5RX                   | 286.20         | Brill. Purple 2R Acra Conc.    | 779.85  |
|                       | 249.95         | Navy Blue M3R                | 355.70         | Blue 2R Powder Fine            | 675.30  |
|                       | 2002.35        | Brill. Blue MR               | 405.60         | Blue BC Acra Con Pdr. Fine     | 1013.15 |
|                       | 2459.45        | Brill. Blue M RX             | 214.20         | Blue BC Conc. Pdr. Fine        | 713.65  |
|                       | 143.00         | Brill. Blue M-G              | 226.45         | Blue R Conc. Pdr. Fine         | 719.70  |
|                       | 538.65         | Blue M 4GD                   | 369.40         | Blue Conc. Powder              | 645.80  |
|                       | 652.60         | Navy Blue M RB               | 341.85         | Brill. Blue 2R Hly. Conc.      | 378.55  |
|                       |                | Turquoise M-G                | 240.30         | Blue RR Supra Powder           | 629.35  |
|                       |                | Brill. Blue M GX             | 516.25         | Brill. Blue 2R Supra Disp.     | 115.65  |
| <b>SION COLOURS</b>   | <b>Per Kg.</b> | Blue 3R Acra Powder          | 718.20         | Dark Blue 2R Powder Fine       | 512.65  |
|                       |                | Dark Brown H 6R              | 248.45         | Blue BC Supra Disp.            | 419.65  |
| en Yellow HR          | 207.95         | Cobalt Oxide                 | 285.00         | Jade Green XBN Powder Fine     | 555.80  |
| Yellow H4G            | 145.65         | Green H4BD                   | 287.00         | Jade Green XBN Acra            |         |
| a Yellow H-8GP        | 168.55         | Green H-E4BI                 | 169.80         | Conc. Pdr                      | 1026.05 |
| Yellow HE6G           | 214.75         | Red Brown H IF               | 143.25         | Jade Green 2G Pdr. Fine        | 533.25  |
| W G-E4R               | 276.05         | Orange Brown H 28            | 209.05         | Jade Green 2G/Ptg. Paste       | 125.40  |
| Yellow H7G            | 332.30         | Brown M GRN                  | 188.80         | Jade Green XBN Ptg. Paste      | 126.00  |
| ow M4R                | 275.45         | Black H-N                    | 314.20         | Jade Green 2G Supra Disp.      | 618.00  |
| ow MGR                | 387.65         |                              |                | Olive D Pdr. Fine              | 563.90  |
| Yellow M4G            | 201.15         |                              |                | Olive Green B Supra Disp.      | 421.70  |
| Yellow M8G            | 366.10         | <b>SULPHUR COLOURS</b>       | <b>Per Kg.</b> | Jade Green XBN Supra Disp. (N) | 327.30  |
| ow M3R                | 244.70         | Navy Blue                    | 210.35         | Olive OMW Powder Fine          | 698.55  |
| Orange R2R            | 303.80         | Green G                      | 194.55         | Olive OMW Supra Disp.          | 538.05  |
| Red H7B               | 157.95         | Black Grains Extra           | 72.25          | Olive D Supra Disp.            | 361.70  |
| Orange M2R            | 313.15         | Black Grains OG              | 73.70          | Olive R Supra Disp.            | 470.25  |
| Red H8B               | 213.55         | Black GXE Conc.              | 70.85          | Olive D. Ptg. Paste            | 193.00  |
| Scarlet H RN          | 245.05         | Black GXE                    | 57.90          | Olive Green B Ptg. Paste       | 199.10  |
| pra Red H-3BP         | 179.80         | Black GXR                    | 69.40          | Olive Green B Acra Conc.       | 741.10  |
| Red H-F3B             | 243.45         | Black Grains 800             | 62.80          | Olive R Acra Conc.             | 779.85  |
| Magenta HB            | 182.00         | Black EXR Grains             | 73.70          | Brown R Pdr. Fine              | 869.45  |
| Red M 5B              | 160.05         | Black EXR Grains 800         | 59.35          | Dark Brown 3R Fine             | 826.25  |
| Red M 8B              | 218.35         |                              |                | Brown G Supra Disp             | 582.05  |
| Pink MB               | 137.10         |                              |                | Brown 2G Supra Disp.           | 716.10  |
| Magenta MB            | 163.65         |                              |                | Brown R Supra Disp.            | 547.35  |
| Purple H-3R           | 219.55         | <b>VAT COLOURS (ICI)</b>     | <b>Per Kg.</b> | Brown BR Powder                | 867.75  |
| Purple H-7R           | 175.40         | Yellow 5G Supra Disperse     | 561.85         | Dark Brown 3R Ptg. Paste       | 217.15  |
| ay Blue H 3R          | 333.75         | Yellow 5G Acra Conc          | 818.60         | Dark Brown 3R Supra Disp       | 529.00  |
| Blue H-GR             | 406.40         | Gold Orange 3G Pdr. Fine     | 1158.45        | Brown G Acra Conc.             | 967.95  |
| Blue H5G              | 207.95         | Brill. Orange 6R Pdr. Fine   | 624.35         | Brown M. Powder Fine           | 768.80  |
| ue H 5RX              | 286.20         | Gold Orange 3G Supra Disp    | 693.85         | Grey M. Supra Disp.            | 585.45  |
| Blue H 7G             | 213.95         | Brill. Orange 6RX Powder     | 394.30         | Blue BC Acra Conc. Pdr. Fine   | 762.70  |
| Blue H 7RX            | 358.15         | Brill. Red 3B Pdr. Fine      | 1214.15        | Direct Black AC Supra Disp.    | 415.75  |
| Turquoise HA          | 265.05         | Brill. Red 3B Supra Disp     | 867.45         | Direct Black AC Pdr. Fine      | 574.70  |
| upra Blue H-3RP       | 595.30         | Brill. Purple 3R Acra Powder | 827.05         | Direct Black CH Supra Disp     | 400.45  |
| upra Turquoise H 2G R | 181.50         |                              |                | Direct ACD Ptg. Pas 9          | 217.15  |



## Delhi Market

**DELHI: JULY 21, (NNS)** A mixed trend prevailed during the week under review in the local chemical market, says NNS. As a result of arrival of about 7000 tonnes of imported paraffin wax at Bombay port, its prices sharply declined by Rs. 70 at Rs. 790. Its prices are further likely to fall on arrival of imported paraffin wax in the local market. Its price in Bombay was quoted at Rs. 750 per 50 kg. In the wake of arrival of about 150-200 bags of boric acid technical, its prices sharply moved down by Rs. 100 at Rs. 1,400 per 50 kg. Mercury recorded a sharp decline of Rs. 200 at Rs. 11,600 per flask, on account of increased selling by quota holders. In the wake of increased demand from the traders of the South, Camphor powder and thal jumped up by Rs. 2/4 at Rs. 102/114 per kg. During a month its prices rose to a new high of Rs. 10/12 per kg. Import from France being negligible coupled with dwindling stock in the market, tartaric acid shot up by Rs. 250 at Rs. 10,750 while citric acid was placed at its previous level. As a result of short supply, caustic soda flakes rose to Rs. 600 per bag from Rs. 555/560 but at the end of the week due to improved supply it declined by Rs. 20/25 at Rs. 575/580 still

showing a gain of Rs. 20. On increased demand from the bakery manufacturers, ammonia bicarb registered a rise of Rs. 5 at Rs. 145 owing to decline in arrival from Sambhal, Moradabad, Rampur, Amroha and Chandausi areas of U.P. coupled with increased demand from local as well as Pakistan. Menthol bold recorded a rise of Rs. 20 at Rs. 350. Menthol medium grade moved to Rs. 315 from Rs. 305 while menthol flake spurted by Rs. 17 at Rs. 250. Deals for menthol flake July delivery are reported to have been settled at Rs. 253 instead of Rs. 233.

Menthol oil Shivalik and MS one also moved up by Rs. 11 at Rs. 176 and Rs. 186 respectively in sympathy with menthol flake. Prices of D.M.O. remained constant. On fresh arrival its prices are likely to move down. Short supply on increased rates by the manufacturers, made glycerine move up by Rs. 2/3 at Rs. 55/58. Naphthalene balls recorded a rise of Rs. 25 at Rs. 1,325 per 50 kg on increased demand. In the wake of shortage in the beginning of the week, titanium dioxide anatase and RC-822 moved up to Rs. 130 and Rs. 158 from Rs. 125 and Rs. 155, but later on it drifted lower by Rs. 10 at Rs. 120 & Rs. 150 on commencement of production in Kerala factory.

### (DELHI MARKET RATES AS ON JULY 21, 1989)

|                              |                |
|------------------------------|----------------|
| Ammonia Bicarb (Per 25 Kg.)  | 145.00         |
| Mercury (Per flask)          | 11,600.00      |
| Soda ash (Per bag)           | 330/345.00     |
| Ammonium Chloride (50 Kg.)   | 110/180.00     |
| Caustic soda flakes (50 Kg.) | 575/580.00     |
| Citric acid (Per 50 Kg.)     | 2,200/2,550.00 |
| Stable Bleaching Powder      |                |
| Shriram (Per 25 Kg.)         | 100.00         |
| Stable Bleaching Powder KCl  |                |
| (Per 25 Kg.)                 | 95.00          |
| Stable Bleaching Powder      |                |
| Maruti (Per 25 Kg.)          | 90.00          |
| Stable Bleaching Powder      |                |
| Modi (Per 25 Kg.)            | 98.00          |

|                                   |             |
|-----------------------------------|-------------|
| Stable Bleaching Powder           |             |
| Modi (Per 25 Kg.)                 | 98.00       |
| Sodium Bicarbonate (50 Kg.)       | 290/300.00  |
| Sodium Hydrosulphite (Per Kg.)    | 35.00/37.00 |
| Rangolite (Per Kg.)               | 62.00/74.00 |
| Boric acid Technical (Per 50 Kg.) | 1,400.00    |
| Paraffin Wax (Per 50 Kg.)         | 790.00      |
| Tartaric Acid (Per 50 Kg.)        | 10,750.00   |
| Borax Granular (Per 50 Kg.)       | 700.00      |
| Borax Crystal (Per 50 Kg.)        | 705.00      |
| Sodium Nitrite (Per 50 Kg.)       | 700/760.00  |
| Sodium Nitrate (Per 50 Kg.)       | 415.00      |
| Camphor Thal (Per Kg.)            | 114.00      |
| Camphor Powder (Per Kg.)          | 102.00      |

|                                    |                  |
|------------------------------------|------------------|
| Menthol Bold (Per Kg.)             | 350.00           |
| Menthol Medium (Per Kg.)           | 315.00           |
| Menthol Flake (Per Kg.)            | 250.00           |
| Glycerine (Per Kg.)                | 55/58.00         |
| Sodium Silicate (Per quintal)      | 250/300.00       |
| Hexamine (Per Kg.)                 | 30.50            |
| Acetic Acid Glacial (Per Kg.)      | 14.50            |
| Copper Sulphate                    |                  |
| (Per quintal)                      | 2,350/2,700      |
| Formic Acid (Per Kg.)              | 25.00            |
| Formaldehyde (Per Kg.)             | 8.50             |
| Hydrogen Peroxide (Per Kg.)        | 28.00            |
| Calcium Carbonate                  |                  |
| (Per Tonne)                        | 2,500/4,000      |
| Acid Slurry Soft (Per Kg.)         | 24.00            |
| Acid Slurry Hard (Per Kg.)         | 32.00            |
| Phosphoric Acid (Per 50 Kg.)       | 1,000.00         |
| Potassium Nitrate                  |                  |
| (Per quintal)                      | 900/1,200.00     |
| Potassium Permanganate             |                  |
| (Per 50 Kg.)                       | 4,900.00         |
| Sodium Bichromate                  |                  |
| (Per 50 Kg.)                       | 1,575/1,600.00   |
| Trisodium Phosphate (50 Kg.)       | 450/455.00       |
| Titanium Dioxide Anatase (Per Kg.) | 122.00           |
| Titanium Dioxide RC-822 (Per Kg.)  | 153.00           |
| Zinc Oxide                         |                  |
| (Per metric tonne)                 | 44,000/52,000.00 |
| Phenol Carbolic Acid (Per Kg.)     | 37.00            |
| Carbon Tetrachloride (Per Kg.)     | 24.65            |
| Chloroform (Per Kg.)               | 28.00            |
| Sodium Sulphate                    |                  |
| (Per metric tonne)                 | 3,200/3,500.00   |
| Naphthalene Balls (Per 50 Kg.)     | 1,325.00         |

| DYES & COLOURS | (Per Kg.)  |
|----------------|------------|
| Naphthol AS    | 175/201.65 |
| Naphthol ASG   | 180/295.20 |
| Naphthol ASBS  | 210/248.45 |
| Naphthol ASTR  | 265/360.45 |
| Naphthol ASOL  | 210/238.60 |
| Naphthol ASBO  | 195/260.75 |

| DIRECT DYES           | (Per Kg.)  |
|-----------------------|------------|
| Black E. Conc.        | 110/176.90 |
| Diazo Black B.T.      | 105/147.55 |
| Green B               | 90/140.55  |
| Blue 2-B              | 60/101.40  |
| Blue 2-B 225% (JNR)   | 125.00     |
| Sky Blue FB           | 160/235.05 |
| Basic Auramine        | 55/110.00  |
| Basic Rhodamine       | 325/425.00 |
| Basic Methylene Blue  | 100/180.00 |
| Basic Violet          | 150/180.00 |
| Basic Malachite Green | 150/165.00 |
| Acid Orange           | 55/111.20  |
| Congo Red H/C         | 75/120.95  |



# Madras Market

Markets were very good with consumption picking up. There has been relaxation in power cuts and the power position is likely to improve further as reports of good rain in catchment areas are coming in. There is good demand for caustic soda both in lye as well as in flake forms and the prices continue to rule high. Local manufacturers' commitment for export is still on which

restricts the availability to local consumers. Also, consumption of soda ash in Tamil Nadu has gone up considerably with new silicate units coming up. Two units have already gone into production at Bhuvanagiri area in the Cauvery basin using the available natural gas in Oil and Natural Gas Commission wells. Two more units are under erection and two are in the planning stages.

## (MADRAS MARKET RATES AS ON JULY 22, 1989)

|                                                 |           |                                           |          |
|-------------------------------------------------|-----------|-------------------------------------------|----------|
| Acetic Acid Glacial (per kg)                    | 18.00     | Calcium Carbonate (Precipitated) (per MT) | 5,000.00 |
| Aluminium Sulphate Iron free (per MT)           | 4,000.00  | Citric Acid (per kg)                      | 47.00    |
| Ammonium Bicarbonate (per 25 kgs)               | 150.00    | Copper Sulphate (per kg)                  | 24.00    |
| Ammonium Chloride (per MT)                      | 3,000.00  | Cresylic Acid 96-99% (per kg)             | 130.00   |
| Acid Slurry (per kg)                            | 28.00     | Pure Para Cresol 96% (per kg)             | 80.00    |
| Barium Carbonate (per kg)                       | 6.00      | Meta Para Cresol 42% (per kg)             | 48.00    |
| Barium Chloride (per kg)                        | 5.50      | Formic Acid (per kg)                      | 27.00    |
| Boric Acid Technical (per kg)                   | 27.00     | Formaldehyde (per kg)                     | 8.00     |
| Bleaching Powder (per 50 kgs)                   | 225.00    | Glue Flakes (per kg)                      | 15.00    |
| Borax (per 50 kgs)                              | 725.00    | Glycerine (per kg)                        | 48.00    |
| Caustic Soda Flakes - Mettur Chemicals (per MT) | 12,800.00 | Hydrosulphite of Soda (TCPL) (per kg)     | 41.00    |
| Caustic Soda Flakes - Andhra Sugars (per MT)    | 12,800.00 | Hydrosulphite of Soda (IDI) (per kg)      | 43.00    |
| Calcium Chloride 70% Solid (per MT)             | 3,000.00  | Hydrosulphite of Soda (BASF) (per kg)     | 43.00    |
| Calcium Chloride Anhydrous (per MT)             | 5,500.00  | Hexamine (per kg)                         | 30.00    |
| Calcium Carbonate (Activated) (per MT)          | 6,000.00  | Hyflo Supercell (per kg)                  | 22.00    |
|                                                 |           | Hydrogen Peroxide (per kg)                | 29.50    |
|                                                 |           | Litharge (per kg)                         | 40.00    |
|                                                 |           | Lead Acetate (per kg)                     | 42.00    |
|                                                 |           | Magnesium Carbonate (per kg)              | 19.50    |

|                                        |          |
|----------------------------------------|----------|
| Magnesium Chloride (per kg)            | 3.50     |
| Maleic Anhydride (per kg)              | 40.00    |
| Menthol Crystals (per kg)              | 300.00   |
| Oxalic Acid (per kg)                   | 24.00    |
| Paraffin Wax (per kg)                  | 20.00    |
| Potassium Bichromate (per kg)          | 36.00    |
| Phosphoric Acid (per kg)               | 22.00    |
| Polyvinyl Alcohol powder (per kg)      | 140.00   |
| Pentaerythritol (per kg)               | 50.00    |
| Phthalic Anhydride (per kg)            | 29.00    |
| Soda Ash (TAC) (per 75 kgs)            | 385.00   |
| Soda Ash (TATA) (per 75 kgs)           | 385.00   |
| Sodium Bicarbonate (TATA) (per 50 kgs) | 375.00   |
| Sodium Silicate (per MT)               | 3,000.00 |
| Sodium Bichromate (per kg)             | 28.00    |
| Sodium Nitrate (per kg)                | 8.00     |
| Sodium Nitrite (per kg)                | 15.00    |
| Sodium Sulphide Flakes (per kg)        | 12.50    |
| Sodium Bisulphite (per kg)             | 4.50     |
| Sodium Alginate (per kg)               | 240.00   |
| Sodium Acetate (per kg)                | 7.00     |
| Sodium Sulphate (Anhydrous) (per kg)   | 3.00     |
| Titanium Dioxide (Anatase) (per kg)    | 130.00   |
| Titanium Dioxide (Rutile) (per kg)     | 145.00   |
| Trisodium Phosphate (per kg)           | 7.00     |
| Urea (Technical) (per kg)              | 3.00     |
| Zinc Oxide (per kg)                    | 54.00    |
| Zinc Chloride Powder (per kg)          | 12.50    |
| Zinc Sulphate (per kg)                 | 6.75     |

## SOLVENTS

|                                 |       |
|---------------------------------|-------|
| Acetone -- HOCL (per kg)        | 18.75 |
| Butanol (per kg)                | 36.00 |
| Butyl Acetate (per kg)          | 44.00 |
| Benzene (per lit)               | 17.50 |
| Cellosolve (per kg)             | 50.00 |
| Carbon Tetra Chloride (per kg)  | 23.00 |
| Chloroform (per kg)             | 28.00 |
| Diacetone Alcohol (per kg)      | 29.50 |
| Diethylene Glycol (per kg)      | 45.00 |
| Dichloroethane (per kg)         | 17.00 |
| Di-octyl Phthalate (per kg)     | 50.00 |
| Di-N-butyl Phthalate (per kg)   | 50.00 |
| Ethyl Acetate (per kg)          | 21.00 |
| Isopropyl Alcohol (per kg)      | 28.00 |
| Methanol (per kg)               | 10.00 |
| Methylene Chloride (per kg)     | 23.00 |
| Methyl Ethyl Ketone (per kg)    | 42.00 |
| Methyl Isobutyl Ketone (per kg) | 40.00 |
| Phenol (per kg)                 | 35.00 |
| Sorbitol (per kg)               | 15.00 |
| Triethanolamine (per kg)        | 60.00 |
| Trichloroethylene (per kg)      | 25.00 |
| 1-1-1 Trichloroethane (per kg)  | 27.00 |
| Turpentine (per lit)            | 17.00 |
| Toluene (per lit)               | 22.00 |
| Xylene (per lit)                | 24.00 |



# International Bulk Chemical Prices

Spot Prices are as on July 5, 1989

Naphtha prices reached \$162-164/ton cif NWE. Ethylene prices tumbled to \$350-370/ton cif NWE. Observers stress that oversupply continues to dominate the market and lower numbers are expected. Propylene appears to have stabilized somewhat, with the threat of oversupply, through imports, receding. Butadiene prices have risen to \$320-

330/ton fob NWE, due to lack of prompt supply.

Benzene slipped to \$255-260/ton fob NWE with excess supplies. Toluene prices remained steady at \$230-235/ton fob NWE. Paraxylene prices were up to \$600-620/ton fob NWE. Orthoxylene prices are down to \$300-310/ton fob

NWE. Xylenes were facing increased downward price pressure, with supply outstripping demand. Solvent xylene has dropped to \$300-305/ton fob Rotterdam, with virgin at \$305-310/ton fob NWE. Styrene prices have crashed to \$620-650/ton cif NWE, for T1 material. Methanol is static for both T1 and T2 material.

| Product                | European Spot price range \$/ton | US price range \$/ton |
|------------------------|----------------------------------|-----------------------|
| Ethylene               | 350-370 (cif)                    | 705-727               |
| Propylene (100% basis) | 432-442 (cif)                    | 462-528               |
| Butadiene              | 320-330 (fob)                    | 396-418 (spot)        |
| Benzene                | 255-260 (fob)                    | 282-285 (spot)        |
| Toluene                | 230-235 (fob)                    | 243-258 (spot)        |
| Xylenes (virgin)       | 305-310 (fob)                    | 289-292 (spot)        |
| (solvent)              | 300-305 (fob)                    | n.a.                  |
| Styrene                | 660-690 (T2)(fob)                | 661-683 (spot)        |
|                        | 620-650 (T1) (cif)               |                       |
| Paraxylene             | 600-620 (fob)                    | n.a.                  |
| Orthoxylene            | 300-310 (fob)                    | n.a.                  |
| Ammonia                | 120-125 (c&f)                    | 142-150 (fob)         |
| Methanol               | 127-130 (T2)(fob)                | 158-160 (fob)         |
|                        | 107-112(T1)(cif)                 |                       |
| Naphtha                | 162-164 (cif)                    | n.a.                  |

## Shipping News

### VESSELS DUE IN BOMBAY FOR EXPORT LOADING

| Due Date<br>(1) | Steamer's Name & Flag<br>(2)     | Agents<br>(3)                           | Will load for<br>(4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Approx. sailing dt.<br>(5) |
|-----------------|----------------------------------|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| 2/8             | Orient Triumph<br>(Cyp)(Voy-311) | Transworld/<br>O.S.A.                   | Los Angeles; Longbeach; Sanfrancisco; Oakland; Seattle; Vancouver; New York; Boston; Toronto; Montreal; Philadelphia; Norfolk; Baltimore; Charleston; Savannah; Jacksonville; Miami; New Orleans; Houston. (Carting at M-178/180 Cotton Depot for both).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 6/8                        |
| 29/7            | Supanya<br>(Voy-27)(Thai)        | Samrat/<br><br>U.L.A./<br><br>E.S.P.L./ | Longbeach; Oakland; Seattle; Los Angeles; Sanfrancisco; Philadelphia; Savannah; Charleston; Baltimore; Norfolk; New York; Boston; St. John; Vancouver; Montreal; Toronto; New Orleans; Houston. (Carting at M.B.)<br>Los Angeles; Sanfrancisco; Oakland; Seattle; Vancouver; Charleston; Houston; Norfolk; Baltimore; New York; Halifax; Montreal; Toronto; S. American and West Indies Ports. (Carting at M-171/173 C. D.).<br>LongBeach; Charleston; New York; St. John; Norfolk; Oakland; Vancouver (B.C.); Seattle; Montreal; Baltimore; Boston; Chicago; Dallas; Houston; Longview; Los Angeles; New Orleans; Philadelphia; Portland; San Diego; Mexico City; Sanfrancisco; Siouxfall; Sacramento; Stockton; Halifax; Toronto; Savannah; Tacoma; Miami and all other destinations. Also Caribbean ports. (Ctg. at M.B.).<br>S. America; Caribbean & Central American ports. (Carting 7-W/H-PD).<br>S. American Ports. (Carting at M-Jetha Cotton Depot). | 3/8                        |
| 30/7            | Vishwa Parimal<br>(Ind)          | Trident/<br>Arebee<br>S.C.I.            | New York; Baltimore; Savannah (Direct) and other inland destinations. (Carting at Timber Pond No. 1).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 3/8                        |



| (1)    | (2)                              | (3)         | (4)                                                                                                                                                                                                                                                                                                                                                                                                                                                   | (5) |
|--------|----------------------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 1/7    | Hoegh Duke<br>(Hongkong)         | Patvolk     | Montreal & Toronto via Halifax; New York; Boston; Norfolk; Charleston; Houston; Savannah; Wilmington; Philadelphia; Baltimore; New Orleans & FCL Chicago; Milwaukee; Atlanta; Dallas. (Carting at H.B. No. 5 and B.P. Extn.).                                                                                                                                                                                                                         | 6/8 |
| 29/7   | Uni Pioneer<br>(Voy-011)         | Greenways   | New York; Newark; Baltimore; Charleston; New Orleans; Houston; Boston; Providence; (RI); Philadelphia; Norfolk; Savannah; Jacksonville; Wilmington; Miami; Montreal; Toronto; Bermuda; Los Angeles; Longbeach; San Francisco; Oakland; San Diego; Stockton; Richmond; Alameda; Redwood City; Sacramento; Seattle; Portland; Vancouver (B.C.); Tacoma; Longview; Chicago; Dallas; various inland destinations and Caribbean ports. (Ctg. at G/H C.D.). | 3/8 |
| 3/8    | CMB Ebony/                       | C.M.B.      | Norfolk; New York; Baltimore; Boston; Charleston; Savannah;                                                                                                                                                                                                                                                                                                                                                                                           | 5/8 |
| 5/8    | CMB Effort<br>(Nhava Sheva)      |             | Houston; Miami; New Orleans; Via Antwerp; Montreal; Toronto; Halifax. (Carting at Kalamboli & CFS).                                                                                                                                                                                                                                                                                                                                                   | 7/8 |
| 8/8    | Robert E Lee<br>(V-55)(AME)      | Samarth     | Philadelphia; Baltimore; Norfolk; New Orleans; Houston; Savannah; New York. (Carting at P/Q-PD).                                                                                                                                                                                                                                                                                                                                                      | 9/8 |
| 2/8    | Orient Triumph<br>(V-311)        | Transworld  | Monrovia; Lome; Lagos; Douala; Tema; Takordi; Abidan; San Petdo (Carting at M-178/180 Cotton Depot).                                                                                                                                                                                                                                                                                                                                                  | 6/8 |
| 3/8    | CMB Ebony/                       | C.M.B.      | Lagos; Abidjan; Lome; Douala; Matadi; Port Gentil; Pointe Noire;                                                                                                                                                                                                                                                                                                                                                                                      | 5/8 |
| 5/8    | CMB Effort<br>(Nhava Sheva)      |             | Nouakchott; Cotonou; Dakar; Luanda; Monrovia; Tema via Antwerp. (Carting at Kalamoboli & CFS).                                                                                                                                                                                                                                                                                                                                                        | 7/8 |
| Stream | Volosko (Yug)                    | Oceanic     | Hodeidah; Jeddah; Trieste; Rijeka. (Carting at 17-ID).                                                                                                                                                                                                                                                                                                                                                                                                | 4/8 |
| 29/7   | Supanya                          | E.S.P.L.    | Le Havre; Rotterdam; Antwerp; Hamburg; Bremerhaven; (LCL only) (Carting at Mallet Bunder).                                                                                                                                                                                                                                                                                                                                                            | 3/8 |
| 25/7   | Drvar (Yug)                      | Oceanic     | Jeddah; P. Said; Rijeka.                                                                                                                                                                                                                                                                                                                                                                                                                              | 8/8 |
| 2/8    | Orient Triumph<br>(Cyp)(Voy-311) | Transworld  | Djibouti; Hodeidah; Alexandria; Benghazi; Tripoli; Malta; La Spezia; Mersin; Naples; Limassol; Piraeus; Genoa; Leghorn; Fos; Valencia; and all inland destinations; Jeddah; P. Sudan; Assab; Massawaa. (Carting at M-178/180 Cotton Depot).                                                                                                                                                                                                           | 6/8 |
| 3/8    | CMB Ebony/                       | C.M.B.      | Djibouti; Port Sudan; Jeddah; La Spezia; Valencia; Genoa; Barcelona;                                                                                                                                                                                                                                                                                                                                                                                  | 5/8 |
| 5/8    | CMB Effort<br>(Nhava Sheva)      |             | Marseilles; Tunis; Casablanca; Tangier; Alexandria; Piraeus; Mersin; Limassol; Felixstowe; London; Liverpool; Manchester; Birmingham; Avonmouth; Dublin and all inland destinations in U.K.; Antwerp; Rotterdam; Hamburg; Bremen; Leixoes; Lisbon; Copenhagen; Oslo; Gothenburg; Stockholm; Malmao; Aarhus; Helsinki. (Carting at Kalamboli & CFS).                                                                                                   | 7/8 |
| 30/7   | Vishva Parimal<br>(Ind)          | S.C.I.      | Felixstowe; Hamburg; Rotterdam; Antwerp; Bremen; Liverpool; Le Havre; Manchester; Avonmouth; London; Belfast; Aarhus; Oslo; Copenhagen; Gothenburg; Helsinki and all inland destinations. (Carting at Timber Pond No. 1).                                                                                                                                                                                                                             | 3/8 |
| 31/7   | Fr. Zubrzycki                    | Khemka      | Gdansk. (Carting at Wadi Bunder No. 3).                                                                                                                                                                                                                                                                                                                                                                                                               | 5/8 |
| 29/7   | Uni Pioneer<br>(V-011)(Pan)      | Greensways  | Hamburg; Felixstowe; Rotterdam; Antwerp; Le Havre; Leghorn; Genoa; Marseilles; (Fos); Valencia; Barcelona; Limassol; Las Palmas; Casablanca; Istanbul. (Carting at G/H Cotton Depot).                                                                                                                                                                                                                                                                 | 3/8 |
| 8/8    | Robert E Lee                     | Samarth     | Assab; (Alexandria). Carting at P/Q-PD).                                                                                                                                                                                                                                                                                                                                                                                                              | 9/8 |
| 24/7   | Kabir                            | Sitara      | Karachi (Afghanistan).                                                                                                                                                                                                                                                                                                                                                                                                                                | 4/8 |
| 29/7   | Supanya<br>(Voy-27) (Thai)       | Samrat/     | Singapore (Direct); Penang; Jakarta; Surabaya; Belawan; P. Kelang; Bangkok; Manila; Hongkong; Kaohsiung; Keelung; Taichung; Busan; Yokohama; Nagoya; Kobe; Osaka; Tokyo. (Carting Mallett Bunder).                                                                                                                                                                                                                                                    | 3/8 |
|        |                                  | Trident/    | Busan; Hongkong; Keelung; Kobe; Nagoya; Yokohama; Penang; P. Kelang; Bangkok; Kaohsiung; Singapore. (Carting at 7-W/H-PD).                                                                                                                                                                                                                                                                                                                            |     |
|        |                                  | U.L.A./     | Singapore; Penang; P. Kelang; Keelung; Kaohsiung; Bangkok; Busan; Jakarta; Chinese ports. (Carting at M-171/173 Cotton Depot).                                                                                                                                                                                                                                                                                                                        |     |
|        |                                  | E.S.P.L./   | Dalian; Quindao; Tianjin (Xiangang); Nawtong; Shanghai; Ningbo; Xiamen; Fuzhou; Guangzhou; Whampoa; Vietnam. (Carting at M.B.)                                                                                                                                                                                                                                                                                                                        |     |
|        |                                  | Transworld/ | P. Kelang; Penang; Keelung; Kaohsiung; Busan; Bangkok; Kobe; Yokohama; Nagoya; Tokyo; Shimizu. (Carting at M-178/180 C.D.).                                                                                                                                                                                                                                                                                                                           |     |
|        |                                  | I.M.E.      | Singapore; Bangkok; Hongkong; Keelung; Busan; Kobe; Yokohama; Nagoya. (Carting at Wadi Bunder No. 3).                                                                                                                                                                                                                                                                                                                                                 |     |
| 24/7   | Zinoviv Solovyev                 | Transocean  | Singapore; Kobe; Nagoya; Yokohama.                                                                                                                                                                                                                                                                                                                                                                                                                    | 4/8 |
| 28/7   | S/o. Nagaland                    | S.C.I.      | Main Japan ports.                                                                                                                                                                                                                                                                                                                                                                                                                                     | 7/8 |
| 27/7   | Velenje (Yug)                    | Depe        | Hongkong; Keelung; Kaohsiung; Kobe; Yokohama; Busan.                                                                                                                                                                                                                                                                                                                                                                                                  | 4/8 |
| 29/7   | Uni Pioneer<br>(V-011)(Pan)      | Greenways   | Singapore; Penang; Port Kelang; Bangkok; Djakarta; Surabaya; Manila; Cebu; Kaohsiung; Keelung; Osaka; Yokohama; Kobe; Shimizu; Moji; Nagoya; Pusan; Hongkong. (Carting at G/H C.D.).                                                                                                                                                                                                                                                                  | 3/8 |
| 8/8    | Robert E Lee                     | Samarth     | Singapore. (Carting at P/Q-PD).                                                                                                                                                                                                                                                                                                                                                                                                                       | 9/8 |



| (1)  | (2)                             | (3)                                                     | (4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | (5) |
|------|---------------------------------|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 29/7 | Supanya                         | Samrat/<br>Trident/<br>Arebee/<br>Transworld/<br>Kanika | Brisbane; Sydney; Melbourne; Adelaide; Fremantle; Burnie. (Carting at Malle Bunder).<br>Brisbane; Sydney; Melbourne; Adelaide; Fremantle; Burnie; Auckland; Wellington; Lyttelton. (Carting at 7-W/H-PD).<br>Sydney; Melbourne; Adelaide; Brisbane. (Carting at M-Jetha C.D.).<br>Sydney; Melbourne; Adelaide; Fremantle; Burnie; Brisbane. (Carting at M-178/180 Cotton Depot).<br>Brisbane; Sydney; Melbourne; New Castle; Adelaide; Fremantle; Auckland; Wellington; Lyttelton. (Carting at Timber Pond No. 3). | 3/8 |
| 2/8  | Orient Triumph<br>(V-311) (Cyp) | Transworld                                              | Sharjah; Dubai; Abu Dhabi; Amjan; Doha; Kuwait; Dammam; Baghdad; Basrah; Syria and inland destinations in Gulf. (Carting at M-178/180 Cotton Depot).                                                                                                                                                                                                                                                                                                                                                               | 6/8 |
| 3/8  | CMB Ebony<br>(Nhava Sheva)      | C.M.B.                                                  | Dubai; Abu Dhabi; Bahrain; Kuwait; Dammam; Doha. (Carting at Kalamboli & CFS).                                                                                                                                                                                                                                                                                                                                                                                                                                     | 5/8 |
| 5/8  | CMB Effort<br>(Nhava Sheva)     | C.M.B.                                                  | Dar Es Salaam; Mombasa (Direct); Nacala; Tanga; Kampala; Blantyre; Lusaka; Noola; Matwara; Llongwe and all inland destinations in E. Africa. (Carting at Kalamboli & CFS).                                                                                                                                                                                                                                                                                                                                         | 7/8 |

## VESSELS DUE IN BOMBAY FOR IMPORT DISCHARGE

| Due Date | Steamer's Name           | Agents     | From                      |
|----------|--------------------------|------------|---------------------------|
| 5/8      | Alegre                   | Transimpex | S. America                |
| 5/8      | CMB Effort (Nhava Sheva) | C.M.B.     | UK Cont./US/Med./E.Africa |
| 3/8      | CMB Ebony (Nhava Sheva)  | C.M.B.     | UK Cont./US/Med. Ports.   |
| 8/8      | Robert E Lee             | Samarth    | U.S.A.                    |
| 6/8      | Shazli                   | Intermodal | Turkey                    |



Paints, Pharmaceuticals, Pesticides & Chemicals  
Manufacturers for your Requirements of

## NOCIL PRODUCTS

ACETONE

DIACETONE

ISOPROPANOL

N-BUTANOL

M.I.B.K.

IPA-CBM

ISOBUTANOL

E.D.C.

2-ETHYL HEXANOL

P.E.G. 200/300/400/600/1500

M.E.G.

D.E.G.

Please contact Authorised Distributor:

## SHREE AMBICA TRADING CORPORATION

Bombay Office:

813, Raheja Centre, 214, Nariman Point,  
BOMBAY - 400 021

Phones: 240415/243979/2873680

Telex: 011-6053 SATC-IN

Ahmedabad Office:

4A-B, Trade Centre, Near Stadium House,  
Ahmedabad-380 014

Phone: 462332/440084



# Materials Imported

## BOMBAY

(From 7.4.89 to 12.4.89)

**ACETOACET MONO METHYL-AMIDE:** From Japan: NOCIL, 48 Ts., Rs. 12,85,296.

**ACRYLAMIDE:** From Japan: Purva Chemtex Pvt. Ltd., 1,020 Kgs., Rs. 25,681; Ashok Dye Chem, 1,020 Kgs., Rs. 25,681; G.S.A. (India) 5 Ts., Rs. 1,18,200; Hico Products Ltd., 1,000 Kgs., Rs. 1,88,833; Madhav Corporation, 15,000 Kgs., Rs. 3,46,272; Polyorganics Chemicals Pvt. Ltd., 1,800 Kgs., Rs. 2,54,924; Shri Vallabh Chemicals, 1 MT., Rs. 22,863; From Netherlands: Overseas Waterproofing Corp., 1,000 Kgs., Rs. 30,527.

**ACRYLIC ACIDS:** From Japan: ASF India Ltd., 20,000 Kgs., Rs. 6,22,902; PDI Chemicals Ltd., 1,000 Kgs., Rs. 2,57,064.

**ADIPIC ACID:** From FRG: Colour Chem Ltd., 5,000 Kgs., Rs. 96,787; New Polyurethane Inds., 3 MTs., Rs. 59,178.

**ALDEHYDE C-10:** From FRG: Gupta & Co. Ltd., 150 Kgs., Rs. 23,923.

**ALIPHATIC ALCOHOL:** From SA: Lubrizol India Ltd., 91,960 Kgs., Rs. 42,96,250.

**ALLYL CAPROATE:** From France: H. Kelkar & Co. Ltd., 1,080 Kgs., Rs. 1,76,948.

**ALUMINIUM OXIDE SYNTHETIC:** From FRG: Grindwell Norton Ltd., 1,500 Kgs., Rs. 23,293.

**AMINO DIPHENYLAMINE PURE DISTILLED:** From FRG: Bayer (I) Ltd., 14,400 Kgs., Rs. 13,62,544.

**ANILINE OIL:** From FRG: Bayer (I) Ltd., 37,860 Kgs., Rs. 10,80,520.

**2B ACID TECH.:** From UK: Sudarshan Chemical Inds., 1,967 Kgs., Rs. 1,77,353.

**BETA IONONE 100%:** From UK: Quest International Industrial Ltd., 184

Kgs., Rs. 69,784.

**BETA PHENYL ETHYL AMINE:** From FRG: Hoechst India Ltd., 600 Kgs., Rs. 1,04,513.

**BROMOCHLORODIFLUORO METHANE:** From UK: Midas Care Pharmaceuticals Pvt. Ltd., 1,170 Kgs., Rs. 65,092.

**BROMINE LIQUID:** From Israel: J. Kirit & Bros, 11,340 Kgs., Rs. 2,87,300; Skylead Chemicals Pvt. Ltd., 11,340 Kgs., Rs. 2,94,437; From Netherlands: Colour Chem Ltd., 11,340 Kgs., Rs. 2,87,299; Pridor Chemicals & Extractions 11,340 Kgs., Rs. 2,87,299; Rallis India Ltd., 45,360 Kgs., Rs. 11,13,121; Southern Sea Foods Pvt. Ltd., 11,340 Kgs., Rs. 2,87,300.

**BUTACHLOR TECH. 92% MIN.:** From USA: Agro Inputs Ltd., 14,525 Kgs., Rs. 7,45,828; Gujarat Agro Inds. Corp., 34,920 Kgs., Rs. 6,91,928; Sumex Chemicals Ltd., 3,920 Kgs., Rs. 7,18,541.

**CALCIUM BORIDE:** From FRG: Greaves Foseco Ltd., 250 Kgs., Rs. 88,138; Multimetals Ltd., 500 Kgs., Rs. 1,76,340.

**CALCIUM LIGNOSULPHONATE:** From Norway: Colour Chem Ltd., 12,000 Kgs., Rs. 62,463.

**CARBON BLACK:** From FRG: Ceat Tyres of India Ltd., 1,000 Kgs., Rs. 23,923; Gujarat State Fertilisers Co. Ltd., 720 Kgs., Rs. 1,21,312; Kores (I) Ltd., 300 Kgs., Rs. 25,182.

**CHLORO ACETYL CHLORIDE:** From Switzerland: Sudarshan Chemical Inds., 4,000 Kgs., Rs. 1,25,888.

**2 CYANO PYRAZINE 99%:** From Japan: Calyx Chemicals, 400 Kgs., Rs. 2,36,975.

**CYANURIC CHLORIDE:** From FRG: Aeromax Synthetic Inds., 500 Kgs., Rs. 23,084; Alfa Industries, 1,000 Kgs., Rs. 46,168; Atlas Dyechem Inds., 1,000 Kgs., Rs. 46,168; Atic Industries Ltd., 17,650 Kgs., Rs. 8,00,040; Assoc-

iated Intermediates Chem., 1,000 Kgs., Rs. 46,168.; From FRG: Bhavani Dye Chem Inds., 500 Kgs., Rs. 23,084; Chemco International, 17,650 Kgs., Rs. 8,04,667; Chemiequip Ltd., 2 MTs., Rs. 92,335; Ekta Enterprises, 500 Kgs., Rs. 23,084; Jagson Industries, 1,000 Kgs., Rs. 46,168; Krishnakant Chemical Inds., 1,000 Kgs., Rs. 46,168; Laxmi Traders, 500 Kgs., Rs. 23,084; Poseidon Chemicals, 500 Kgs., Rs. 23,084; S.B. Vora & Co., 1,000 Kgs., Rs. 46,168.

**CYCLOHEXYL ISO CYANATE:** From FRG: Hoechst India Ltd., 400 Kgs., Rs. 71,350.

**D-PARA HYDROXY PHENYL GLYCINE METHYL POTASSIUM DANE SALT:** From Singapore: Gujarat Lyka Organics Ltd., 1,000 Kgs., Rs. 3,30,457.

**D(-) ALPHA PHENYL GLYCINE CHLORIDE HYDROCHLORIDE:** From Netherlands: Cepham Organics Ltd., 5,005 Kgs., Rs. 17,92,733; Morepen Labs Pvt. Ltd., 3,500 Kgs., Rs. 12,50,767; Supriya Drugs & Pharmaceuticals, 4,030 Kgs., Rs. 7,08,820.

**DL-2 AMINO 1-BUTANOL:** From FRG: Medchl Chemicals & Pharmaceuticals, 6,045 Kgs., Rs. 8,32,326.

**DL-2 AMINOBUTANOL:** From FRG: Lupin Laboratories Ltd., 76,050 Kgs., Rs. 95,26,635.

**DL-METHIONINE FEED GRADE:** From France: R. Ratanlal & Co., 1,000 Kgs., Rs. 49,231; Sarvodaya Enterprises, 5,000 Kgs., Rs. 2,40,062; Tetragon Chemie Pvt. Ltd., 3,000 Kgs., Rs. 1,57,675.

**DESMODUR T 80:** From FRG: Jai Industries, 38,000 Kgs., Rs. 12,94,604.

**DIAMINE DIPHENYLMETHANE:** From Japan: Dr. Beck & Co. I. Ltd., 18,000 Kgs., Rs. 9,46,050.

**DICALCIUM PHOSPHATE:** From UK: Colgate Palmolive (I) Ltd., 1,08,000 Kgs., Rs. 15,47,339.

**2,3 DICHLORO 1,4 NAPHTHAQUIN-**



NONE: From Japan: Sudarshan Chemical Industries, 1,000 Kgs., Rs. 1,66,026.

DICYANDIAMIDE: From FRG: Himachem Labs, 32,000 Kgs., Rs. 8,48,810; From Japan: Bayer (I) Ltd., 14,400 Kgs., Rs. 4,16,234.

DICYCLOHEXYLAMINE: From Japan: Bayer (I) Ltd., 14,400 Kgs., Rs. 4,16,234.

2,4 DIHYDROXY QUINOLINE: From FRG: Serene Dyestuffs Inds. Ltd., 1,962.5 Kgs., Rs. 7,26,365.

DIISOBUTYL KETONE: From FRG: Haryana Leather Chemicals Ltd., 5,440 Kgs., Rs. 1,25,804.

DIMETHYL BENZYL CARBINOL: From Switzerland: Gupta & Co. (P) Ltd., 150 Kgs., Rs. 30,538.

DIMETHYL CHLORO SILANE: From FRG: Rallis India Ltd., 2,000 Kgs., Rs. 77,225.

DIMETHYL FORMAMIDE: From FRG: Atul Products Ltd., 5,130 Kgs., Rs. 98,181; Cipla Ltd., 14,820 Kgs., Rs. 2,79,901; From Japan: Rallis India Ltd., 7.6 MTs., Rs. 1,34,258.

DIMETHYL SUCCINYL SUCCINATE: From Austria: Sudarshan Chemical Inds. Ltd., 400 Kgs., Rs. 75,546.

DIMETHYL SULPHOXIDE: From USA: Bombay Drugs & Pharm Pvt. Ltd., 17,237 Kgs., Rs. 4,39,412.

DIMETHYL UREA: From FRG: Bakul Aromatics & Chemicals Ltd., 10,000 Kgs., Rs. 1,99,848.

DIPHENYL AMINE: From USA: Ascent Trading Co., 9.64 MTs., Rs. 17,96,962.

DIPHENYL GUANIDINE: From France: Puneet Resins Private Limited, 5 MTs., Rs. 2,85,788; From FRG: Modi Rubber Limited, 3,000 Kgs., Rs. 2,21,878.

DIPHENYLMETHANE DIISOCYANATE: From FRG: Greaves Foseco Ltd., 8,000 Kgs., Rs. 6,65,634.

DIPHENYL OXIDE: From USA: Indian Dyestuff Inds. Inc., 10,925 Lbs., Rs. 81,26,896.

DISTEARYL THIO DIPROPIONATE: From Japan: Shriram Vinyl & Chemicals Inds., 200 Kgs., Rs. 15,872.

ETHYL CELLULOSE: From USA: Merind Ltd., 3,175 Kgs., Rs. 77,069.

2 ETHYL HEXYL ACRYLATE: From Japan: Rajesh Dychem Industries Pvt. Limited., 5,040 Kgs., Rs. 1,80,454.

ETHYL HEXYL ACRYLATE: From Japan: Sanghi Leathers Private Limited, 28,800 Kgs., Rs. 8,63,574.

ETHYL MERCAPTAN: From Netherlands: Cyanamid India Ltd., 19,050 Kgs., Rs. 4,22,647.

ETHYL METHACRYLATE: From France: PDI Chemicals Pvt. Ltd., 2,820 Kgs., Rs. 1,37,565.

ETHYL VANILLIN: From France: Neelikon Dyestuffs, 500 Kgs., Rs. 2,03,782.

ETHYLENE GLYCOL MONOETHYL ETHER: From Belgium: Dura Chemical Corp. Pvt. Ltd., 8,930 Kgs., Rs. 1,94,640.

FURFURYLAMINE: From France: Hoechst India Ltd., 3,080 Kgs., Rs. 2,88,715.

GAMMA FERRIC OXIDE: From FRG: Jai Electronic Inds. Pvt. Ltd., 2,200 Kgs., Rs. 1,82,304; From USA: Music Systems, 5,987.48 Kgs., Rs. 29,036.

GLUTARALDEHYDE SOL.: From FRG: S.D. Fine Chem Pvt. Ltd., 1,290 Kgs., Rs. 1,81,213.

GUM ROSIN: From China: Pudumjee Co. Ltd., 17.55 MTs., Rs. 1,46,369; Pudumjee Pulp & Paper Mills, 17.55 MTs., Rs. 1,46,369; From Hong Kong: Sigma Paints Ltd., 17,500 Kgs., Rs. 1,44,988.

HELIOTROPIN: From Japan: Hindustan Lever Ltd., 3,000 Kgs., Rs. 11,86,784.

HEXACHLORO CYCLO PENTADIENE: From USA: Excel Industries Ltd., 187.3 MTs., Rs. 5,52,748.

HEXYNEDIOL: From FRG: Grauer & Weil India Ltd., 550 Kgs., Rs. 56,140.

HYDROQUINONE: From France: Arun & Co., 5,000 Kgs., Rs. 2,40,063.

HYDROTROP ALCOHOL: From FRG: Mc. Davar Aromatics Pvt. Ltd., 300 Kgs., Rs. 80,110.

HYDROXY ETHYL CELLULOSE: From Netherlands: Vam Organic Chemicals Ltd., 15,000 Kgs., Rs. 89,60,250; From USA: Henkal Chemicals (Ind) Ltd., 2,000 Kgs., Rs. 2,14,552.

3-HYDROXY QUINALDINE 4-CARBOXYLIC ACID: From FRG: BR Industries, 720 Kgs., Rs. 2,58,561.

HYDRAZINE HYDRATE 80%: From France: Shreedhar Carpets (P) Ltd., 200 Kgs., Rs. 5,980.

HYDRAZINE HYDRATE: From Japan: Kwizol Chem Pvt. Ltd., 2,600 Kgs., Rs. 80,743; From USA: Hindustan Ciba Geigy Ltd., 2,600 Kgs., Rs. 1,10,566.

IODINE CRUDE 99.5% MIN.: From Japan: Calibre Chemicals Pvt. Ltd., 3,000 Kgs., Rs. 9,63,046.

ISOBORNYL ACETATE: From GDR: Twincity Organics Pvt. Ltd., 50,000 Kgs., Rs. 8,56,376.

ISO BORNYL METHOXY CYCLO HEXANOL: From Japan: Hindustan Lever Ltd., 540 Kgs., Rs. 92,622; The Tata Oil Mills Co. Ltd., 1,260 Kgs., Rs. 2,26,033.

ISO BUTYL BENZENE PURE: From USA: The Boots Co. (I) Ltd., 13,657 Kgs., Rs. 7,02,746.

ISOBUTYRIC ACID: From FRG: Standard Synthetics, 3,000 Kgs., Rs. 63,711.

ISO OCTYL THIOGLYCOLATE: From FRG: Aryavart Chemicals Pvt. Ltd., 2.1 MTs., Rs. 95,189.



L-BASE: From China: Umedica Lab  
t. Ltd., 1,000 Kgs., Rs. 7,54,481.

L-CARVONE: From Israel: DD  
nah & Co., 2,000 Kgs., Rs. 6,38,883.

L-LYSINE MONO HYDROCH-  
ORIDE: From Japan: Godama Labor-  
ories, 1,000 Kgs., Rs. 1,13,299.

L-LYSINE MONO HCL USP: From  
apan: Nr. Jet Pharmaceuticals Ltd.,  
000 Kgs., Rs. 94,500.

LILIAL: From Switzerland: Fine  
ragrances Pvt. Ltd., 3,610 Kgs.,  
s. 9,06,870.

LINALOOL: From FRG: M.C.  
avar Aromatics Pvt. Ltd., 1,500 Kgs.,  
s. 2,14,050; From Japan: The Tata Oil  
Mills Co. Ltd., 850 Kgs., Rs. 1,07,618.

LINALYL ACETATE: From FRG:  
Gupta & Co. Ltd., 2,000 Kgs.,  
s. 3,10,532; The Tata Oil Mills Co.  
td., 1,080 Kgs., Rs. 1,67,714.

LITHIUM HYDROXIDE MONO  
HYDRATE: From USA: Indrol,  
5,567.55 Kgs., Rs. 10,58,074.

LITHOPONE 30%: From Czecho-  
lovakia: Rally Pulverising Mills,  
0,000 Kgs., Rs. 1,41,050.

MOLYBDENUM TRIOXIDE MIN.  
9.5%: From FRG: Monarch Chemical  
nds., 500 Kgs., Rs. 67,153.

MOLYBDENUM TRIOXIDE:  
From Japan: Sudarshan Chemical Inds.,  
000 Kgs., Rs. 1,14,086.

MONO ETHYLENE GLYCOL:  
From Saudi Arabia: Reliance Inds. Ltd.,  
088.758 MTs., Rs. 2,04,27,573.

2-MERCAPTO BENZOTHAZ-  
OLE: From Korea: Ravindra Kumar  
Vijay Kumar, 5 MTs., Rs. 1,02,284.

METHACRYLIC ACID: From  
USA: Indofil Chemicals Co., 1,29,000  
Lbs., Rs. 16,90,098.

META TOLUENE DIAMINE: From  
FRG: M.B. Finance Corp., 3,000 Kgs.,  
Rs. 1,20,875.

META TOLUENE DIAMINE  
CRUDE: From Japan: Azo Products,

2,000 Kgs., Rs. 85,999.

METHYL ACETOACETATE:  
From USA: Ronak Corp., 15,300 Kgs.,  
Rs. 3,50,949.

METHYL AMYL ALCOHOL:  
From Japan: Lubrizol India Ltd., 66,000  
Kgs., Rs. 12,26,834.

METHYL CHLOROFORMATE:  
From Hungary: BASF India Ltd.,  
14,400 Kgs., Rs. 2,71,919.

METHYL ETHYL KETONE: From  
Netherlands: Kantilal Manilal & Co.,  
13,200 Kgs., Rs. 2,01,484.

METHYL PHENYL PHOSPHENIC  
ACID: From FRG: Hoechst India Ltd.,  
400 Kgs., Rs. 7,00,872.

METHYLENE DIBROMIDE: From  
Netherlands: Rallis India Ltd., 16,750  
Kgs., Rs. 6,89,322.

4,4 METHYLENE 2,6 DITERTI-  
ARY BUTYL PHENOL: From USA:  
Indian Oil Corp. Ltd., 7,256 Kgs.,  
Rs. 4,50,309.

N-PROPYLAMINE: From FRG:

Pfizer Ltd., 4,620 Kgs., Rs. 1,76,840.

N (2 CYANO ETHYL) N-ETHYL  
ANILINE: From UK: Amar Dyechem  
Ltd., 1,400 Kgs., Rs. 59,019.

N-2 CYANO ETHYL METHYL  
ANILINE: From UK: Rathi Dye Chem  
Private Limited, 1,400 Kgs., Rs. 59,019.

N,N-DIBENZYL ETHYLENE  
DIAMINE DIACETATE: From UK:  
Geoffrey Manners & Co. Ltd., 1,000  
Kgs., Rs. 1,91,385.

N,N DIETHYL ANILINE: From  
Japan: Priya Chemicals, 7,410 Kgs.,  
Rs. 4,16,646; Sudarshan Chemical  
Industries Limited, 3,970 Kgs.,  
Rs. 2,27,677.

NEOPENTYL GLYCOL: From  
FRG: Cwell Drugs Pvt. Ltd., 15,000  
Kgs., Rs. 3,21,074; Suneeta Labs Ltd.,  
6,500 Kgs., Rs. 1,44,588.

ORTHO AMINO PHENYL O-  
CRÉSYL ETHER: From France: Col-  
oursynth Inds. Pvt. Ltd., 2,000 Kgs.,  
Rs. 3,78,405.

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ORTHOCHLORO PHENOL: From UK: Sunbeam Monochem Pvt. Ltd., 8,750 Kgs., Rs. 3,74,197.

ORTHANILIC ACID: From FRG: Atic Industries Ltd., 2,600 Kgs., Rs. 3,29,838.

PARA CUMIDINE: From Japan: Hoechst India Ltd., 45,600 Kgs., Rs. 34,34,076.

PARA CHLORO TOLUENE PURE: From FRG: Searle India Ltd., 28,800 Kgs., Rs. 9,06,651; Hiremath Chemicals Ltd., 15,000 Kgs., Rs. 4,21,036.

PARA CRESOL 98% MIN.: From Japan: Hico Products Ltd., 16,000 Kgs., Rs. 7,16,657.

PARAFORMALDEHYDE: From Spain: Joyota Chemical Inds. Pvt. Ltd., 8,500 Kgs., Rs. 76,910.

PNCB: From FRG: Polyolefin India Ltd., 20,488 MTs., Rs. 5,81,352.

PARA OCTYL PHENOL: From Japan: Indian Plastics Ltd., 6,000 Kgs.,

Rs. 1,51,066.

PARA TERTIARY BUTYL PHENOL: From Japan: Indian Plastics Ltd., 4,000 Kgs., Rs. 88,122.

PERCHLOROETHYLENE: From Spain: Prohbe X Aids, 19,220 Kgs., Rs. 2,72,395.

PHENYL XYLYL ETHANE: From Japan: Shreem Capacitors Pvt. Ltd., 9,000 Kgs., Rs. 2,47,843.

PIVALOYL CHLORIDE: From France: Cepham Labs Ltd., 3,060 Kgs., Rs. 1,92,829; Gujarat Lyka Organics Ltd., 3,060 Kgs., Rs. 2,02,996.

POLY METHYLENE POLYPHENYL ISO CYANATE: From Japan: Nebula Chemicals Ltd., 1,000 Kgs., Rs. 40,391.

POLYVINYL ALCOHOL: From Japan: Adil Synthetics Pvt. Ltd., 1,500 Kgs., Rs. 70,812; Gujarat Supertex Pvt. Ltd., 2,000 Kgs., Rs. 94,416; Indian Gypsum Ltd., 2,000 Kgs., Rs. 94,416; Jigna Syntex Pvt. Ltd., 2,000 Kgs.,

Rs. 1,00,711; Lunar Caustic Pvt. Ltd., 2,340 Kgs., Rs. 1,10,467; Pratibha Processors Pvt. Ltd., 3 MTs., Rs. 1,37,178; Rabbani Textiles, 1,000 Kgs., Rs. 47,208.

POTASSIUM BROMATE: From Israel: Uniochem Inds., 3,000 Kgs., Rs. 1,92,137.

POTASSIUM HYDROXIDE SOLID: From USA: Expo Trading Co., 10.55 MTs., Rs. 1,18,191.

POVIDONE IODINE: From FRG: Artex Labs Pvt. Ltd., 560 Kgs., Rs. 1,19,868.

PROPIONIC ACID: From FRG: Neeliton Dyestuffs, 16,380 Kgs., Rs. 1,99,386.

PROPYLENE GLYCOL: From Singapore: Dr. Beck & Co. (I) Ltd., 34,400 Kgs., Rs. 7,36,195.

PROPYLENE OXIDE: From FRG: United Pestichem & Nonionics Pvt. Ltd., 1,600 Kgs., Rs. 63,808.

SILICON METAL: From China: Emeer Metal Inds., 18 MTs., Rs. 3,32,817.

SODIUM BROMATE: From Israel: Unichem Inds., 2,000 Kgs., Rs. 95,990.

SODIUM 2 ETHYL HEXANOATE: From Ranbaxy Labs Ltd., 1,000 Kgs., Rs. 64,878.

SODIUM CUMENE SULPHONATE: From FRG: Grauer & Weil India Ltd., 5,070 Kgs., Rs. 67,923.

SODIUM GLUTAMATE 99% MIN.: From France: Balkrishna Trading Co., 18,000 Kgs., Rs. 3,82,386; From Thailand: Jiva Kuka & Co., 14,400 Kgs., Rs. 3,64,874.

SODIUM LAURYL SULPHATE: From FRG: N. Arvind & Co., 11,000 Kgs., Rs. 3,23,173.

SODIUM META SULPHITE: From FRG: Empex Agencies, 500 Kgs., Rs. 29,380.

SODIUM METHALLYL SULPHONATE: From Japan: J.K. Synthe-

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cs Ltd., 3,000 Kgs., Rs. 1,62,868.

**SODIUM MONO FLUORO PHOSPHATE:** From FRG: Colgate Palmolive (I) Ltd., 5,000 Kgs., Rs. 1,73,077.

**SODIUM NITRITE:** From China: Nitu Enterprises, 14,100 Kgs., Rs. 73,219.

**SODIUM SULPHOXYLATE FORMALDEHYDE:** From Czechoslovakia: Arjun Impex, 20,000 Kgs., Rs. 3,02,250.

**SULPHONIC ACID:** From France: Lubrizol India Ltd., 1,18,100 Kgs., Rs. 28,39,651; From UK: Continental Device India Ltd., 5 Ltrs., Rs. 581.

**TERPENE HYDRATE BPC:** From Spain: The Boots Co. (I) Ltd., 1,500 Kgs., Rs. 80,253.

**TERTIARY BUTYLAMIDE:** From Belgium: Cipla Ltd., 540 Kgs., Rs. 24,838.

**TETRAMETHYL THIURAM DISULPHIDE:** From GDR: Pacific Export, 16,200 Kgs., Rs. 2,93,787.

**TETRAHYDROFURAN:** From FRG: German Remedies Ltd., 9,040 Kgs., Rs. 2,45,376.

**2-ETHYL THIOETHANOL:** From FRG: Bayer (I) Ltd., 28,800 Kgs., Rs. 25,38,371.

**THIONYL CHLORIDE:** From FRG: Bharat Pulverising Mills Ltd., 16,800 Kgs., Rs. 1,79,096.

**TITANIUM DIOXIDE PIGMENTS:** From USA: Asian Paints India Ltd., 30,000 Kgs., Rs. 11,09,390.

**TITANIUM DIOXIDE ANATASE:** From FRG: Shree Synthetics Ltd., 6,000 Kgs., Rs. 2,56,812.

**TOLUENE DIISOCYANATE:** From FRG: Pallavi Foam Inds. Pvt. Ltd., 19,000 Kgs., Rs. 6,47,302.

**TRIETHANOLAMINE SALT:** From Japan: Hindustan Copper Ltd., 1,216 Kgs., Rs. 2,91,244.

**TRIETHYL CITRATE:** From USA: Duke & Sons Pvt. Ltd., 1,500 Lbs.,

Rs. 73,173.

**3,4,5 TRIMETHOXY BENZALDEHYDE:** From China: Chemifine Intl. Pvt. Ltd., 200 Kgs., Rs. 68,132; From Japan: Jupiter Org. Pvt. Ltd., 2,010 Kgs., Rs. 7,43,292; Zora Pharma Pvt. Ltd., 2,010 Kgs., Rs. 7,33,803.

**TRIMETHYL PHOSPHITE:** From USA: Sudarshan Chemical Inds., 15,513 Kgs., Rs. 5,63,903.

**TRIMETHYLOL PROPANE:** From Sweden: Goodlass Nerolac Paints Ltd., 16,000 Kgs., Rs. 4,55,716.

**TRIHYROXYETHYL ISOCYANATE:** From Belgium: Dr. Beck & Co. (I) Ltd., 18,000 Kgs., Rs. 8,91,452.

**2,4 XYLIDINE:** From Switzerland: Atul Products Ltd., 2,600 Kgs., Rs. 1,80,118.

#### DRUG MATERIALS IMPORTED BOMBAY

(From 7.4.89 to 12.4.89)

**CALCIUM D PANTOTHENATE USP:** From Japan: The Anglo French Drug Co. (I) Ltd., 1,500 Kgs., Rs. 3,29,229.

**CALCIUM D PANTOTHENATE USP/IP:** From Japan: Pfizer Ltd., 1,000 Kgs., Rs. 2,32,107.

**CALCIUM D PANTOTHENATE:** From UK: Uni Sankyo Ltd., 100 Kgs., Rs. 25,149.

**CHLORPROMAZINE HCL BP80:** From Hungary: May & Baker (India) Ltd., 500 Kgs., Rs. 3,65,809.

**CHLORPROMAZINE HCL:** From USSR: M.J. Exports Ltd., 1,008 Kgs., Rs. 6,14,618.

**CREOSOTE BPC:** From Sweden: Parke Davis (I) Ltd., 60 Kgs., Rs. 23,395.

**EPHEDRINE HCL BP80:** From Czechoslovakia: Burroughs Wellcome (India) Ltd., 1,500 Kgs., Rs. 9,39,998.

**IODINE USP:** From FRG: Medi Pharma Drug House, 350 Kgs.,

Rs. 78,278.

**L-LYSINE MONO HCL BP/USP:** From Korea: J. Premchand & Co., 500 Kgs., Rs. 49,254; Rallis India Ltd., 1,000 Kgs., Rs. 95,263.

**LACTIC ACID 88% USP:** From USA: Paras Chemical Corpn., 9,810 Kgs., Rs. 1,42,073.

**MANNITOL USP:** From Brazil: Indo European Chemical Co., 2,000 Kgs., Rs. 51,213.

**MORPHOLINE:** From UK: Bayer (I) Ltd., 16,380 Kgs., Rs. 5,54,176.

**PHENOBARBITONE BP80:** From China: K. Sevantilal & Co., 1,500 Kgs., Rs. 2,51,494.

**PHENYTOIN SODIUM IP:** From Italy: Parke Davis (I) Ltd., 1,000 Kgs., Rs. 2,13,941.

**POVIDONE IODINE USP:** From USA: Wockhardt Ltd., 1,500 Kgs., Rs. 2,93,482.

**PROPYLENE GLYCOL USP:** From Japan: Soujanya Enterprises, 5.67 MTs., Rs. 1,20,452; Wardex Pharmaceuticals Ltd., 10,500 Kgs., Rs. 2,23,058; From USA: Hoechst India Ltd., 8,385 Kgs., Rs. 1,59,756.

**SULPHADIAZINE IP/BP80:** From China: Pharmapak Pvt. Ltd., 3,500 Kgs., Rs. 7,76,202.

**THEOPHYLLINE ANHYDROUS BP80:** From China: Salvi Chemical Inds., 750 Kgs., Rs. 1,74,331.

**VANILLIN USP:** From Norway: Quest International India Ltd., 3,200 Kgs., Rs. 7,32,670.

#### PLASTIC MATERIALS IMPORTED BOMBAY (From 7.4.89 to 12.4.89)

**CAPROLACTUM:** From Belgium: Garware Nylons Ltd., 1,06,500 Kgs., Rs. 31,49,161; J.K. Synthetics Ltd., 608 MTs., Rs. 1,85,60,976; From Netherlands: Nirlon Syn. Fibres & Chem Ltd.,



36 MTs., Rs. 91,00,782; From Spain: Modipon Ltd., 2,50,000 Kgs., Rs. 75,82,757.

HDPE: From Brazil: Gandhi Brothers, 8 MTs., Rs. 1,48,602; From FRG: Indian Telephone Inds. Ltd., 4,950 Kgs., Rs. 2,61,398; From Japan: Garware Wall Ropes Ltd., 1,00,000 Kgs., Rs. 17,65,399; Super Pack, 1 MT., Rs. 17,55,563; From Saudi Arabia: Fabro Plast, 17,150 Kgs., Rs. 2,73,921; Hindustan Vacuum Glass Ltd., 17,150 Kgs., Rs. 2,73,921; Jamnadas Murlidhar Jaisingh, 49,500 Kgs., Rs. 7,87,250; K. Raheja Mercantile, 84.8 MTs., Rs. 13,99,272; Nehal Imports Pvt. Ltd., 51,450 Kgs., Rs. 8,05,572; Niranjana Plastics, 34,300 Kgs., Rs. 5,99,118; Raheja Exports Pvt. Ltd., 51.95 MTs., Rs. 8,13,666; Satya Narayana Plastic Inds., 51.45 MTs., Rs. 7,80,283; Shalimar Pack, 51,450 Kgs., Rs. 8,90,582; Southern Polymers, 49.5 MTs., Rs. 7,16,758; Southern Union Plastics, 49.5 MTs., Rs. 7,50,709; Stylock, 17.15 MTs., Rs. 2,98,208; The Supreme Inds. Ltd., 49.5 MTs., Rs. 7,71,144; Texoplast, 51,450 Kgs., Rs. 8,90,582; U-Plast, 33 MTs., Rs. 5,66,500; From Yugoslavia: Caprihans India Ltd., 30 MTs., Rs. 4,82,216; New Horizon, 12,000 Kgs., Rs. 1,92,862.

LDPE: From France: Albert David Ltd., 32 MTs., Rs. 7,22,095; EPC Inds. Ltd., 16,000 Kgs., Rs. 4,25,503; From Netherlands: Indal, 49.5 MTs., Rs. 11,45,033; From Qatar: IPCL, 500 MTs., Rs. 1,95,49,324; V.K. Engg. & Plastic Inds., 8 MTs., Rs. 1,51,066; From Yugoslavia: Tata Exports Ltd., 13.107 MTs., Rs. 2,67,792.

LLDPE: From Saudi Arabia: The Bharat Vijay Mills Ltd., 240.64 MTs., Rs. 41,38,496; The Supreme Inds. Ltd., 49.50 MTs., Rs. 7,80,888.

PTFE: From UK: Madras International Liniyl Ltd., 1,600 Kgs., Rs. 4,30,133.

PVC RESIN: From FRG: Lucky Plast Pvt. Ltd., 13 MTs., Rs. 2,42,733; R.C.V.P. Pvt. Ltd., 105 MTs., Rs. 20,69,478; From Romania: Kalpana

Plastics, 100 MTs., Rs. 13,15,323; Prakash Pipes & Inds. Ltd., 300 MTs., Rs. 40,42,588; From Taiwan: Freemans Measyres Pvt. Ltd., 2,500 Kgs., Rs. 95,836; From Yugoslavia: Visina Saes Pvt. Ltd., 10.8 MTs., Rs. 2,06,079.

POLYBUTENE: From Japan: Savita Chemical Ltd., 12.24 MTs., Rs. 1,39,922.

POLYETHYLENE GRANULES: From Belgium: Industrial Cables India Ltd., 21.6 MTs., Rs. 9,46,617.

POLYPROPYLENE: From Belgium: Indo Plast Inds., 15,000 Kgs., Rs. 2,43,122; Narendra Plastics, 15 MTs., Rs. 2,43,122; Narendra Polyplast, 15 MTs., Rs. 2,43,122; Plasto Paradise, 15,000 Kgs., Rs. 2,43,122; Polyfilms India, 30 MTs., Rs. 4,86,244; From Czechoslovakia: Associated Plastic Inds., 56 MTs., Rs. 6,17,800; Fibro Plast Corp., 70 MTs., Rs. 7,72,250; Hukamchand & Sons, 28 MTs., Rs. 3,17,362; Mehta Traders, 28 MTs., Rs. 3,17,362; Naresh Traders, 84 MTs., Rs. 9,26,700; United Bros., 28 MTs., Rs. 3,17,362; From FRG: Azam Plastic & Engg. Works, 30 MTs., Rs. 4,86,282; Gujarat Polypack Ltd., 28,500 Kgs., Rs. 6,11,668; Hemant Agencies, 15,000 Kgs., Rs. 2,43,122; From Hungary: Paharpur Plastics, 150 MTs., Rs. 23,60,406; Pan Asia Inter Pvt. Ltd., 30 MTs., Rs. 4,80,125; From Japan: Jaisingh Plastic Inds., 75 MTs., Rs. 6,37,709; From Spain: Bright Bros Ltd., 16.5 MTs., Rs. 3,41,952; Diamond Polyprints, 14,000 Kgs., Rs. 2,46,273; From USA: Die Polyglass India Pvt. Ltd., 30,000 Kgs., Rs. 3,02,766; Foranco, 15,000 Kgs., Rs. 2,65,212; From Yugoslavia: Bihani Plastic Udyog, 31 MTs., Rs. 5,21,680; Camy Enterprises, 15.5 MTs., Rs. 2,85,006; Elite Inds., 15.5 MTs., Rs. 2,60,857; Foreign Fashions, 15.5 MTs., Rs. 2,69,899; Rajiv Plastic Inds., 31 MTs., Rs. 5,23,344; Ravi International, 46.5 MTs., Rs. 7,82,283.

POLYSTYRENE EXPANDABLE: From Korea: Cooline Manufacturers Private Limited, 10,000 Kgs.,

Rs. 2,79,315.

POLYSTYRENE: From Korea: Goel Brother, 51 MTs., Rs. 11,02,035; Janata Plastics Corp., 34 MTs., Rs. 9,50,237.

STYRENE ACRYLATE RESIN: From France: Research Chemical Inds., 550 Kgs., Rs. 33,045.

### DYE MATERIALS IMPORTED BOMBAY (From 13.4.89 to 17.4.89)

SYNTHETIC COALTAR DYES-TUFF: From China: J.P. Shah & Bros., 2,000 Kgs., Rs. 50,355.

OPTICAL WHITENING AGENT: From Japan: Bhavanidas Gangadas & Co., 500 Kgs., Rs. 42,223.

### PLASTIC MATERIALS IMPORTED MADRAS (From 1.6.89 to 15.6.89)

ACETAL COPOLYMER: From Japan: Astra Watches Ltd., 1 MT., Rs. 49,829.

HDPE: From Japan: Mani & Co., 60 MTs., Rs. 10,48,242; Peeyelve Polysacks, 10 MTs., Rs. 1,82,647; From Portugal: Safepack Plastics Pvt. Ltd., 66,000 Kgs., Rs. 10,35,958; From Singapore: Janpex Enterprises, 68 MTs., Rs. 9,75,194; Rabbani Exporters, 35.55 MTs., Rs. 3,84,194; Sree Narasimha Plastic Inds. Pvt. Ltd., 34 MTs., Rs. 5,53,146; From UAE: Indo National Ltd., 24,300 Kgs., Rs. 5,55,332; From USA: V.V. Dhanushkodi Nadar & Sons, 14,000 Kgs., Rs. 2,10,168.

LDPE: From Singapore: Indo National Ltd., 15.5 MTs., Rs. 3,06,989.

PET RESIN: From Korea: Pet Industrial Consumer Packaging Ltd., 20,000 Kgs., Rs. 4,58,445.

PTFE POWDER: From UK: Shri Ram Fibres Ltd., 25 Kgs., Rs. 10,388.

PVC PASTE: From Japan: UB-MEC Batteries Ltd., 14,000 Kgs., Rs. 3,17,093.

PVC RESIN: From Korea: Fenner (I) Ltd., 30,000 Kgs., Rs. 6,31,164.



**PHENOL FORMALDEHYDE ACME RESIN:** From USA: Asst. Control of Stores, Southern Railway, 29,828 Kgs., Rs. 10,70,685.

**POLYESTER RESIN:** From Italy: Ceat Tyres of India Ltd., 100 Kgs., Rs. 4,349.

**POLYETHYLENE:** From Belgium: Hindustan Cables Ltd., 90 MTs., Rs. 23,79,909; From France: MM Rubber Co., 16,250 Kgs., Rs. 3,26,097.

**POLYPROPYLENE:** From FRG: G.K. Trade Co., 34 MTs., Rs. 5,75,250; Kumaragiri Electronics Ltd., 1,931.1 Kgs., Rs. 2,84,451; From Italy: Amco Batteries Ltd., 15 MTs., Rs. 2,88,835; Kunal Engg. Co. Ltd., 15 MTs., Rs. 3,11,234; From Japan: Pandi India Ltd., 50 Kgs., Rs. 1,500; From Portugal: Deccan Polypacks Ltd., 93,000 Kgs., Rs. 14,46,828; From Singapore: Abirami Polybag Inds., 15,500 Kgs., Rs. 2,63,134; Hindustan Plastics Pvt. Ltd., 31 MTs., Rs. 5,31,422; Polyspin Pvt. Ltd., 46,500 Kgs., Rs. 7,41,544; Wonder Plastics, 15.5 MTs., Rs. 2,58,261; From USA: Ananth Plastics Pvt. Ltd., 16,500 Kgs., Rs. 2,73,809; Asian Bags (P)-Ltd., 68,000 Kgs., Rs. 10,31,472; Kunal Engineering Ltd., 34 MTs., Rs. 5,42,458; National Plastic Inds., 68 MTs., Rs. 10,85,916; S.G. Industries, 17 MTs., Rs. 2,81,703; S.G. Industries, 17 MTs., Rs. 2,81,703.

**POLYPROPYLENE RAFFINATE:** From Singapore: Rabbani Exports, 15 MTs., Rs. 2,11,188.

#### DRUG MATERIALS IMPORTED MADRAS (From 1.6.89 to 15.6.89)

**ERYTHROMYCIN THIOCYANATE:** From USA: Tamilnadu Dadha Pharma Ltd., 1,999.7 Kgs., Rs. 22,94,550.

**GRISEOFULVIN BP:** From China: Alfred Berg & Co. Inds. Pvt. Ltd., 60 Kgs., Rs. 51,569.

**HYDROCHLORIDE:** From FRG:

Medopharm, 400 Kgs., Rs. 1,06,260.

**METRONIDAZOLE:** American Remedies Pvt. Ltd., 1,050 Kgs., Rs. 2,59,340.

#### DYE MATERIALS IMPORTED MADRAS (From 1.6.89 to 15.6.89)

**LUGANIL BLACK:** From FRG: BASF India Ltd., 3 Kgs., Rs. 451.

**LUGANIL BROWN:** From FRG: BASF India Ltd., 14 Kgs., Rs. 1,028.

**SAVINYL PINK:** From France: Tata Exports Ltd., 60 Kgs., Rs. 47,602.

#### MATERIALS IMPORTED MADRAS (From 16.6.89 to 22.6.89)

**ACETANILIDE:** From Hungary: Dolphin Drugs Pvt. Ltd., 15,000 Kgs., Rs. 3,53,674.

**ACETYL CHLORIDE:** From FRG: Priya Electronics & Chemicals Ltd., 13,300 Kgs., Rs. 3,25,636.

**ALUMINIUM OXIDE:** From USA: IOC, 703 Kgs., Rs. 14,395.

**AZORIBITYLAMINE:** From FRG: Babros Chemicals Pvt. Ltd., 1,600 Kgs., Rs. 5,77,198.

**BENZENE:** From France: Flavours & Fragrances, 1,760 Kgs., Rs. 41,497.

**CARBON BLACK:** From FRG: Addisons Paints & Chemicals, 1,200 Kgs., Rs. 2,08,924.

**CYCLOHEXANONE:** From Italy: Tropical Agrosystems Pvt. Ltd., 28,880 Kgs., Rs. 6,53,824.

**DL-METHIONINE:** From France: Avet Chemicals Pvt. Ltd., 2,000 Kgs., Rs. 1,00,488; From Japan: SKM Animal Feeds & Foods India Ltd., 22,500 Kgs., Rs. 10,36,976.

**DIBROMO METHANE:** From Israel: SPIC, 4 Bottles, Rs. 200.

**DIMETHYL ACETAMIDE:** From FRG: TTK Chemicals Ltd., 1,140 Kgs.,

Rs. 31,735.

**EPHEDRINE HCL:** From FRG: Medopharm, 150 Kgs., Rs. 1,42,885.

**EPICHLOROHYDRIN:** From Japan: Synthopharm, 12,000 Kgs., Rs. 3,43,300.

**ETHYL ACETATE:** From FRG: Hindustan Lever Ltd., 1 Kg., Rs. 823.

**FURALTADONE:** From USA: Micro Labs Pvt. Ltd., 1,000 Kgs., Rs. 2,38,141.

**FURFURYL MERCAPTAN:** From UK: Bush Boake Allen (I) Ltd., 4 Kgs., Rs. 21,812.

**GAMMA FERRIC OXIDE:** From Japan: Marugappa Electronics Ltd., 720 Kgs., Rs. 77,448; From Singapore: Prakash Pipes & Inds. Ltd., 13 MTs., Rs. 9,47,863.

**GLYCERINE:** From FRG: Khoday RCA Inds., 10 MTs., Rs. 2,74,607.

**GUM BENZOIN:** From Indonesia: Bharat Indl. Corpn., 1 MT., Rs. 76,127.

**GUM ROSIN:** From Indonesia: Reichhold Chemicals I. Ltd., 36,000 Kgs., Rs. 3,03,496.

**HELIOTROPIN:** From Japan: Padmini Products, 270 Kgs., Rs. 99,736.

**HEXAMETHYLENE DIAMINE ADIPATE:** From FRG: Shri Ram Fibres Ltd., 17,500 Kgs., Rs. 5,20,913.

**HYDROXYLAMINE SULPHATE:** From FRG: Globe Organics Ltd., 5,000 Kgs., Rs. 1,46,737; Standard Organics Ltd., 54,000 Kgs., Rs. 13,62,749; From Japan: Standard Organics Ltd., 35,000 Kgs., Rs. 9,09,764.

**L-LYSINE MONO HCL:** From Korea: SKM Animal Feeds & Foods (I) Ltd., 7,000 Kgs., Rs. 4,62,134.

**LINALOOL:** From USA: Florale India Pvt. Ltd., 363 Kgs., Rs. 51,924.

**META XYLIDINE:** From Switzerland: Astra IDL Ltd., 2,000 Kgs., Rs. 23,425.

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Water Treatment Plants & Chemicals  
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**Di-Ammonium Phosphate**

**Mono-Sodium Phosphate -**

**Crystals**

**Mono-Sodium Phosphate -**

**Anhydrous**

**Sodium Acid Pyro Phosphate**

**Di-Sodium Phosphate - Crystals**

**Di-Sodium Phosphate -**

**Anhydrous**

**Tetra Sodium Pyro Phosphate**

**Tri Sodium Phosphate -**

**Anhydrous**

• **Mono Calcium Phosphate**

• **Di-Calcium Phosphate -**

**2H<sub>2</sub>O/Anhydrous**

• **Tri-Calcium Phosphate**

• **Mono Potassium Phosphate**

• **Di-Potassium Phosphate**

• **Tetra Potassium Pyro -**

**Phosphate**

• **Sodium Acetate - Crystals**

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• **Tri Magnesium Phosphate**

• **Zinc Phosphate**

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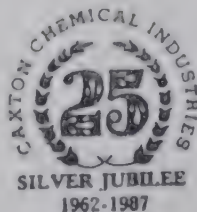
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Village-Wahiv VASAI (EAST)  
Dist: Thane (MAHARASHTRA) Phone: 260





# CAXTON

- Mono-Ammonium Phosphate
- Di-Ammonium Phosphate
- Mono-Sodium Phosphate - Crystals
- Mono-Sodium Phosphate - Anhydrous
- Sodium Acid Pyro Phosphate
- Di-Sodium Phosphate - Crystals
- Di-Sodium Phosphate - Anhydrous
- Tetra Sodium Pyro Phosphate
- Tri Sodium Phosphate - Anhydrous
- Mono Calcium Phosphate
- Di-Calcium Phosphate -  $2H_2O$ /Anhydrous
- Tri-Calcium Phosphate
- Mono Potassium Phosphate
- Di-Potassium Phosphate
- Tetra Potassium Pyro - Phosphate
- Sodium Acetate - Crystals
- Sodium Acetate - Anhydrous
- Tri Magnesium Phosphate
- Zinc Phosphate
- Aluminium Phosphate

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Manufacturers

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NYLOSAN SCARLET 4G 125%

NYLOSAN SCARLET F 36 L  
NEOZOPON YELLOW 157  
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